The Chemical Age

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What is National Service?

PARLIAMENTARY time, newspaper space and public and private discussion have for months past been concerned above all else with the new enthusiasms for what is called National Service, and yet there is still considerable doubt as to the meaning of the term. We know it to be vaguely associated with the need to prepare for a war which all of us hope and some of us believe will never come, and we try to revive what we can remember of the enthusiasms and the energies of 1914-1918. It was then a matter of supplying the men and the needs of large expeditionary forces spread over every battle front and we were inspired to unprecedented effort by the cry from every hoarding that "Your King and Country need you." To-day we hear next to nothing about expeditionary forces, the nature of the appeal has changed and what was, twenty years ago, a demand upon our manhood for self-sacrifice has become rather a play upon our fears and an exhortation to get busy saving our own skins. Between then and now another big change has been wrought amongst us. Then we had to improvise new and novel ways of introducing our woman-power into the national economy, now it is rather a question of finding occupation for millions of women who have acquired a view of their obligations to society and the nation, almost unknown twenty years ago.

There is yet another new factor, the modern enthusiasm for planning, organising and co-ordinating everything. We have built up what would be called in business the overhead until in many branches of endeavour there is far more organisation than output. This is very noticeable in the new demand for National Service, for diligent perusal of lengthy newspaper columns gets us no further than the organising stage, and most of us are still asking what we ourselves are expected to do.

It is admitted that in the event of war from the air a section of the population, perhaps a smaller section than is commonly supposed, will desire to run for safety, and it is therefore necessary for some of us to organise trenches, shelters and evacuation schemes, and measures of wise self-preservation. The number of us, however, who can be occupied as wardens, firemen, stretcher bearers and so on is obviously limited.

It is admitted that we must concentrate on the armament industries, but forty millions of us cannot be engineers. Indeed it is suggested that the practical people at present endeavouring to fill our deficiencies in arms are delayed and hindered rather than helped by the plethora of ministries and the superfluity of planners. It is, of course, impossible to secure a full disclosure of all schemes hatched in Whitehall during the recent crisis, when anybody with suggestions for controlling other people's business was welcomed by those who regard the business classes as an unnecessary remnant of Victorianism. We hear, for instance, of a schedule of industries considered to be redundant. Wiseacres with theories had decided that certain trades could be suspended and others moved to distant parts of the country; indeed, on paper, there was, about October 1, very little of the national economy left to us.

With the new year, even politicians and bureaucrats will begin to turn their thoughts to the question of the Budget, and that will lead them to think more kindly of business activities, even though some theorist may have classified most of them as superfluous. With an income tax to be collected, it may even dawn on some of our controllers that a little "profit" here and there is not altogether an undesirable thing.

The truth is that the subject of National Service requires to be reconsidered and we could do that all the better with a more general recollection of the circumstances of 1914. Our dominating position in the Councils of the Allies at that time was largely due to our financial strength, the strength of the taxpayer on whom the Government relied.

So to-day no sort of service is so truly national as the maintenance and improvement of our economic fabric, and every tradesman who succeeds in adding to his taxable capacity is performing a duty no less valuable than fitting on gas masks, or digging trenches.

National Service comes then to this. If and when there is defence work for which the individual is obviously fitted, it is his duty to undertake it. In all other circumstances it is the duty of everybody to strain every nerve in the following of their ordinary occupations with a view to the maintenance of all those necessities, comforts and delights that make a peaceful life possible and also provide, without saying anything about it, the most vital of the sinews of war.

Given freedom from European political complications I believe that the trade prospects for 1939 are encouraging. My company is, to a certain extent, a barometer of trade at home, and the decline in certain of our activities during the first eight months of the year has been arrested and improvement shown. . . . There is no occasion to be pessimistic; that leads us nowhere.

—*Lord McGowan.*

NOTES AND COMMENTS

Nickel in the Chemical Industry

MR. ROBERT C. STANLEY, chairman and president of the International Nickel Co. of Canada, Ltd., in his annual survey of the nickel industry in 1938, comments upon the progress made in the use of nickel and its alloys in the chemical industry. The use of corrosion-resisting composite materials, such as nickel-clad steel has gained ground during the past few years. During the past year the use of such clad materials has been supplemented by fabrication processes in which sheets of corrosion-resisting material are applied to steel backing plates by means of spot or seam welding either prior to, or after, the fabrication of the equipment. This technique is not novel for stainless steel lined vessels, but it is only during the past year that it has been applied extensively to nickel, Monel and other high nickel non-ferrous alloys. Noteworthy improvements in the quality of Monel, nickel and Inconel castings have been accompanied by a steady increase in the use of these materials in cast form. The survey gives many examples of the fruitful application of nickel and nickel alloy component in processes involving hydrofluoric acid and related compounds, caustic soda, and in the manufacture of viscose, synthetic resins, phenol, soap, etc. An interesting case is the increase of resistance of cast iron to corrosion by strong alkalies through the addition of relatively small amounts of nickel. Recently, there has been a similar trend in connection with steels used by the chemical industry. This has been particularly evident in tubular products such as evaporators and heating coils.

Recovery in America

FURTHER news has reached us of the trade recovery in the United States. We reported that the index of industrial production issued by the Federal Reserve Board stood at 100 in November, having risen from 76 last May. Now it has risen still further to 104, while the volume of retail trade has also improved. A reliable forecast puts the national income for 1939 at 68 billion dollars, compared with 64 billions last year, and already 1,000,000 more jobs have become available in private industry. These figures reflect a return of confidence, as the result of a "soft pedalling" of Government restriction which was one of the causes of the depression in America. There is no doubt that the recent reconciliation between the Government and the leaders of industry will have a beneficial effect on American trade—and hence on world trade—in this new year.

Salt-Cake Output in Germany

RECENT rumours that Germany intends producing larger quantities of salt-cake are contrary to general opinion in the salt-cake industry, so far as any enlarged output will result from extensions in the manufacture of hydrochloric acid. It appears possible that the report has come about by confusing developments in the salt-cake industry with prospective increases in the production of a "by-product salt-cake" extracted from the end lyes of artificial cellulose fibre and staple fibre manufacture. These end lyes contain moderate quantities of recoverable sodium sulphate, and as the volume has expanded greatly in recent months plans have been projected to commence the recovery of the by-product early in 1939. Operations will start on a relatively small scale of a few thousand tons per year, with steady increase to 150,000 tons in ten years' time. The establishment of this new output of salt-cake has already met with opposition from producers in the sodium sulphate cartel, but opposition has been over-ridden in official quarters. Experiments in the recovery of salt-cake from cellulose fibre liquor in the past have generally proved uneconomical. The cost of recovering the product has been above the market price of salt-cake, owing to the relatively expensive double conversion operations involved. The method was therefore abandoned in favour of returning the end lyes to production. If recovery is now developed on a larger scale it may likewise be found uneconomic, but it is possible that the exact costs will be temporarily obscured as much as possible by financial aid in national efforts to promote the welfare of the staple fibre industry. The by-product from end lyes is 99.75 per cent. pure.

Stocks of Non-Ferrous Metals

CONCERN has been expressed concerning the small size of the stocks of non-ferrous metals held in this country. While some other nations, in particular Germany, have purchased large quantities, no attempt has apparently been made to increase our stocks which at the moment are about a quarter of the bulk of Germany's. It has been argued that because we are relying, in a future emergency, upon keeping the sea routes open for foodstuff imports then no difficulty will be experienced in importing non-ferrous metals and ores, of which the great majority of our supply comes from overseas. The reasoning is sound but it must not be forgotten that stocks of certain primary foodstuffs have been set up and attempts are being made to foster home production. If an analogy is to be made between these two classes of essential goods, it is a logical conclusion that stocks of non-ferrous metals and of raw materials for their manufacture should be held also. Such a scheme should be capable of practical application and would have several advantages, not the least of which would be a tendency towards long-period price stabilisation.

The Value of Special Issues

AT regular periods THE CHEMICAL AGE issues special numbers during the course of the year. We have often argued that these issues must necessarily be of even greater interest to readers than ordinary issues, and in so far as they form records of the progress made in their respective subjects during the year under review, they must be filed for reference by business-like readers. A new book just issued in America provides striking confirmation of the soundness of our argument. Entitled "Advertising Media," this new work by two professors of New York University is a typically thorough, five-hundred page study of the various types of vehicle available for carrying the advertiser's message. In a section headed "Special Issues of Business Publications," the authors write:—"Special issues have become quite a media problem in the business-paper field. When a publication puts out special editions to cover an industrial convention, a power show, or a review of the year's activities in some industry, the special edition is a good investment. It will be read more carefully, often filed away for reference, and frequently the demand adds an extra 1,000 or more to the circulation. The wise media expert, in arranging schedules, seldoms misses an insertion in these issues."

Scientific Instruments and Apparatus

New Products of Interest Shown at Physical Society's Exhibition

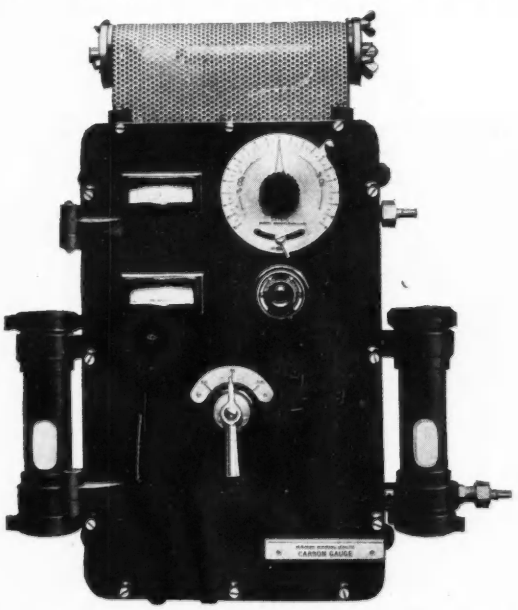
THE 29th annual exhibition of Scientific Instruments and Apparatus, organised by the Physical Society, was held at the Imperial College of Science and Technology, South Kensington, S.W.7, on Tuesday, Wednesday and Thursday of this week. Eighty-four firms exhibited in the trade section and there were twenty-seven contributors to the research and educational section. Descriptions of instruments of interest to the chemical and allied trades, and exhibited for the first time, are given below.

A new colour comparator (Adam Hilger, Ltd.) is an improvement upon the well-known Hilger colour comparator for qualitative colour comparison. By the additions made the observation is rendered quantitative. The device consists of three plate-polarisers, one of which is rotatable and whose position is indicated on a scale. Given any colour difference, the difference in composition of the light may readily be analysed and expressed quantitatively together with total brightness difference by a simple test. The Barfit medium quartz spectrograph with flat field (Adam Hilger, Ltd.) photographs the entire spectrum from 2,000 to 10,000 A. in sharp definition on a flat photographic plate, 10 in. by 4 in. This improvement in performance has been secured by the introduction of a specially computed lens system of advanced design.

A strain tester for large objects (Carl Zeiss (London), Ltd.) forms a practical outfit for strain testing all manner of glassware in glass works and factories. Another wide field of application is the optical study of stress distribution in models of glass, celluloid, cellulose material and bakelite and other elastic and transparent synthetic resins when subjected to mechanical stress.

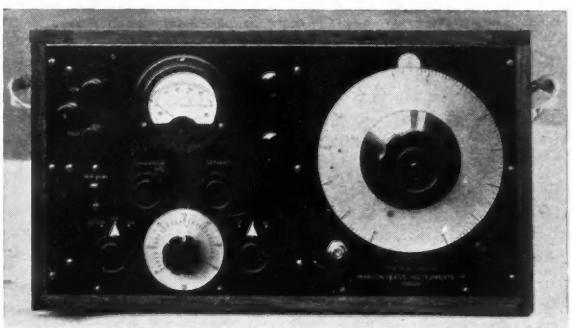
High vacuum diffusion pumps operating with organic pump fluids (W. Edwards and Co.) effect self-purification of the pumping fluid during operation, even when undesirable vapours are being handled. Pumps having pumping speeds from 3 to 1,000 litres per sec. are available. Several new organic fluids of very low vapour pressure have been synthesised for use in high vacuum diffusion pumps.

The Pressovac combined vacuum or pressure pump (W. Edward and Co.) is a new laboratory pump of the " Cenco " range, having a larger capacity than the well-known "Hyvac," a reasonably low limiting pressure and low price. W. Edwards and Co. also showed the Philips vacuum gauge—a new gauge giving a continuous indication of pressures between 1.5 by 10^{-3} mm. and 1 by 10^{-5} mm. of mercury; the Finch electron diffraction camera, fitted with split shutter plate holder; and an ultra high speed centrifuge operating *in vacuo* and having a total capacity of 100 c.c.



Combined CO_2 and oxygen meter made by Elliott Brothers (London) Ltd.

A 4 in. edgewise temperature indicator (Elliott Brothers (London), Ltd.) is a new type of temperature indicator specially designed for pin mounting on certain furnaces, notably the "G.L.C." range of muffle, high speed steel and assay furnaces. It is a high-grade instrument having mirror scale and knife-edge pointer, while being of the horizontal edgewise type with vertical pivots, it has a very satisfactory sensitivity with low friction losses and a negligible temperature coefficient.



The new *p*H meter introduced by Marconi-Ekco Instruments, Ltd.

A combined CO_2 and oxygen meter (Elliott Brothers (London), Ltd.) has been developed for the purpose of obtaining a convenient and accurate indication of the carbon dioxide and oxygen content of the atmosphere in cold stores. It depends in principle upon the fact that the thermal conductivity of carbon dioxide differs appreciably from that of the other gases normally present. This company also showed a disappearing filament optical pyrometer of new type designed to combine in one handy portable instrument all the components which have previously been separate items of some bulk and inconvenience, *viz.*, the telescope, battery and temperature indicator.

A battery operated *p*H meter (Type TF511) (Marconi-Ekco Instruments, Ltd.) is a self-contained and portable unit for the measurement of hydrogen-ion concentration with the glass electrode. The scale is direct-reading in either millivolts up to 1,300 mV. or *p*H up to 13 according to the setting of a switch. The meter is housed in a wooden case with a detachable lid, and the case includes a compartment containing a dip-type electrode assembly. This assembly consists of a clamp supporting the glass electrode and calomel reference half cell, together with two beakers. The beaker sizes are selected to suit microtitrations and general measurements. The *p*H meter is also suitable for oxidation-reduction potential measurements with the *r*H electrode.

A further development of Philips industrial X-ray service (Philips Lamps, Ltd.), is the introduction of an instrument for the determination of the thickness of the walls of pressure vessels of all descriptions by means of X-rays. The sensitivity of this device is said to be approximately 2 per cent. higher than that of the ionisation chambers usually applied, while a measuring accuracy of approximately 1 per cent. of the wall thickness is achieved. In addition to the determination of the wall thickness, this instrument will also

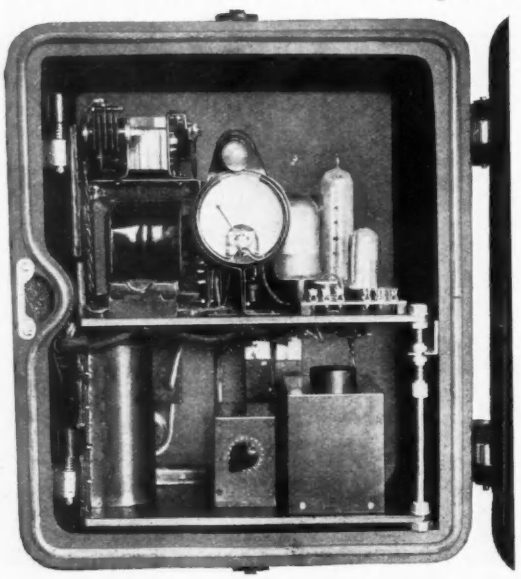
indicate those places where corrosion, slag inclusions or blow holes influence the strength of the structure.

Two Multelec instruments (George Kent, Ltd.) were shown, one arranged to record continuously the varying *p*H of raw effluent, and the other arranged as an automatic controller regulating the dosage of an alkaline reagent and recording on a chart the result of the control in the form of a steady *p*H line. This company also exhibited a new portable *p*H measuring set (accuracy ±0.05 *p*H), and a specific gravity recorder for liquids. This latter consists principally of two vertical tubes, one containing a standard liquid and the other containing the liquid of which the varying specific gravity is to be recorded. The differential pressure resulting from these two unequal columns is transmitted, usually by air reaction, to the U tube of a standard differential meter. A continuous record of the specific gravity is thus obtained on a 12 in. diameter circular chart which can be adjusted to rotate either once in a day or once in a week.

New Time Cycle Process Recorder Controller

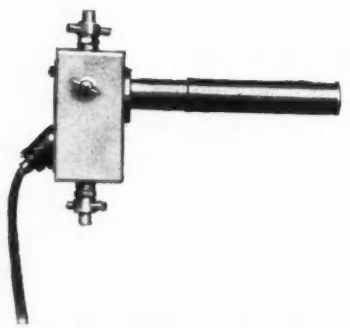
A time cycle process recorder controller (Negretti and Zambra) controls temperature in relation to time, providing a means of controlling an entire process in agreement with a predetermined temperature/time or pressure/time curve. An example is the rubber vulcanising process where temperature is raised at a predetermined rate to vulcanising point, maintained there for the required curing period, at the end of which the steam supply is cut off and exhaust or cooling water valves operated. A three-switch control indicator (Negretti and Zambra) is a simple three-step alarm or control instrument where three different requirements are taken care of with an interval of temperature (or pressure) change between each.

Negretti and Zambra also showed an indicator air-operated controller (a modified form of simple air-operated controller having a modified choice of three separate fixed throttling ranges suitable for control of pressure, temperature or liquid level); the Duckworth air-operated hygrostat (intended for use in the control of air-conditioning plant where a comparatively simple instrument is desired with the advantage of a readily adjustable throttling range); a 12 in. chart indicating recorder (this may be adapted to record temperature, pressure or liquid level on a 12 in. chart with the addition of a bold indicating scale 10½ in long. The scale may be illuminated from a standard 25 w. lamp contained in a compartment at the rear of the instrument and arranged so that the heat from the lamp is completely dissipated); a new type indicating pyrometer (a robust assembly particularly suitable for industrial conditions); an indicating multipoint potentiometric pyrometer (the galvanometer is compensated for temperature variation, circular type scale is used, having an effective length of 17½ in. facilitating very accurate measurement); and an air temperature resistance thermometer (an improved design intended for use where a large number of points necessitate an economic type of fitting).



The amplifier unit of the Foster photoelectric high-speed recording pyrometer enclosed in water-cooled case

The Foster photoelectric high-speed recording pyrometer (Foster Instrument Co., Ltd.), which was shown last year in its initial form, has been developed in directions greatly extending the value of the temperature information it provides. A photocell is exposed to the radiation emitted by the hot body, and the resulting electrical effect is converted and amplified to operate a direct-writing high-speed recorder. The cell is devised to be specially sensitive to the heat rays emitted, and is mounted in a patented housing which limits its cone of vision to the hot-body surface and also provides for the water cooling necessary in hot situations. The amplification is also of a patented construction to give high speed and an open scale over the working range, developing sufficient direct current to actuate a robust direct-writing recorder. The amplifying unit, with all its accessory apparatus, is mounted on a hinged and sprung sub-frame, and is enclosed in a hermetically sealed case also provided with water cooling.



Receiver unit of the Foster photoelectric high-speed recording pyrometer mounted in water-cooled housing.

In some cases where the temperature of a furnace or other apparatus has to be controlled automatically, instantaneous and continuous response to temperature change is important. For such cases the very rapid response of the photoelectric cell is employed. In the photoelectric temperature controller (Foster Instrument Co., Ltd.), the amplifying apparatus is arranged to dispense with all mechanical movements such as moving coils, pointers, depression of pointer, and so forth, thus the time lag incidental to such arrangements is avoided. In conjunction with this apparatus is an alarm which prevents the attainment of any excessive temperature. Press buttons are provided for hand control or adjustment, and a time switch for automatically starting up the furnace at any desired time before work begins.

The Foster Instrument Co., Ltd., also exhibited an indicating potentiometric temperature controller, the Foster-Birlec interlocked automatic temperature control (for controlling industrial furnaces within very close limits), and a two-point "dial" pyrometer recorder.

A Novel Paint Tester

The Megger paint tester (Evershed and Vignoles, Ltd.) enables a rapid determination to be made of the comparative values of different kinds of paint, varnish and other coating materials such as wax, enamel, linseed oil, etc. In the light of recent research, paints and other coating compositions may be considered as membranes which, although initially impermeable, become permeable as the material deteriorates. The tester, by measuring the rate of decay of the osmotic or electrosmotic resistivity of the paint membrane, can compare the comparative life of different coatings in the course of a few hours.

Charles Hearson and Co., Ltd., showed the Lanameter, a microprojection apparatus for measuring the diameter (thick-

ness) of wool, raw silk, natural or artificial silk fibres and which can be accurately read to 0.001 mm. (1 micron); a materials microscope (Reichert MEG), an inverted microscope of the Le Chatelier type equipped for visual work and photomicrography with magnifications × 40 up to × 1,700; and the McArthur-Hearson portable microscope.

The new balances exhibited by L. Oertling, Ltd., were a prismatic reflecting microchemical balance; an aperiodic prismatic reflecting balance, fitted with device which enables all weights up to 1 g. being placed on the pan without opening the case; a semi micro-chemical balance, fitted with prismatic reflecting device; and a magnetic prismatic reflecting assay balance.

New Aperiodic Balance and Water Stills

In the B.T.L. aperiodic balance (Baird and Tatlock (London), Ltd.), it is only necessary to select weights down to 1 g. in the pan as the final determination is simply made to 0.0001 g. from outside the case. This company also showed an anti-vibration table for balances; an humidity conditioning oven, in which the air is circulated by a fan over a tray of a wetted salt and through the main part of the oven (ranges obtainable are from 10 per cent. R.H. at 20° C. to 98 per cent. at 100° C. or 13 per cent. at 168° C.); a thermoregulator, capable of making or breaking a contact at any temperature, varied at will, between 0° C. and 150° C.; the Gaza safety still, in which the gas is cut off should the water supply fail; and the Baraglass still, a new automatic all-glass still, working on a novel principle which practically eliminates the dissolved gases, and thus produces continuously from a tap-water feed 1.5 litres per hour of distilled water, having *p*H 6.1-6.2, and conductivity 1.6-1.7 gemmhos.

Among the new optical instruments displayed by E. Leitz (London), were the universal microscope "Ortholux," which has a built-in light source for visual work and photomicrography; a comparison microscope for work by incident light; and the Leitz-Jelley microrefractometer, a simple instrument capable of measuring the refractive index of so little as 0.0005 c.c. of a liquid correct to 0.001.

The Tintometer, Ltd., showed the Lovibond tintometer, fitted with Rothamsted device enabling conversion of Lovibond readings into international units; graphs for converting readings, taken with the instrument, into C.I.E. units, were also on view.

Included in the new exhibits of A. Gallenkamp and Co., Ltd., were an angle head micro centrifuge (a new improved pattern with streamlined head to take four tubes; hand and electric models shown); a Wassermann bath in Monel metal (gas heated with a new type burner which reduces the amount of condensation to a minimum); a paraffin vacuum embedding bath in Monel metal; a paraffin embedding oven and bath in Monel metal (fitted with a perforated shelf and twelve spun Monel pots with lids and handles); and a complete range of new pattern retort stand clamps and bossheads in non-corrodible alloys.

A Self-Recording Viscosimeter

A viscosimeter (British Physical Laboratories) meets the requirements of the chemical industry for a self-recording viscosimeter. It operates on the falling sphere method and covers a range from 500 to 25,000 centistokes. The readings on the scale of the meter are in tenths of a second, and the corresponding values of viscosity expressed in terms of centistokes, Redwood or Saybolt seconds or in Engler degrees can be ascertained from tables supplied for various specific gravities. The instrument is completely self-contained and mains operated and is suitable for shop-use by unskilled labour.

James Swift and Son, Ltd., exhibited a new series of "Technical" microscopes, specially designed and built for industrial investigation and routine. All include correctly adjusted polarising prisms, which may be instantly thrown in or out of the field, a divided rotating stage and a high angle condenser which allows of the observation of interference figures. A new model of the Utilex colorimeter was shown, in which the original stainless steel mirrors are replaced by a novel prismatic system.

A projection saccharimeter (Bellingham and Stanley, Ltd.), was shown in its latest form, using the largest polariser that can be accommodated by observation tubes of standard size. Improved optical systems are used for viewing the field and the scale. The scale length is adjustable and can be set within close limits. This unique feature is of special value since the instrument can be readjusted to suit a revised value of the International sugar scale. A continuous flow tube of new design was shown.

An improved Jones-Miller calorimeter (Griffin and Tatlock, Ltd.), was developed for use in determining to an accuracy of approximately 0.5 per cent. the calorific value of gas samples about 400 ml. in volume, such as may be obtained with the Gray-King coal assay apparatus. The principle of the instrument is to burn slowly a measured volume of gas at atmospheric pressure in a stream of oxygen in a combustion chamber, which forms part of the calorimeter. In this improved form, both the measuring burette and the calorimeter are mounted on one integral stand (instead of as formerly on separate stands), resulting in greatly increased stability and convenience in operation. Improvements have also been effected in the form of the stirrer used in the calorimeter, by which the reciprocating type originally described has been eliminated and an efficient rotatory type substituted, still further contributing to ease of manipulation and to stability.

Beckman *p*H meter (industrial model) made by Griffin and Tatlock, Ltd.

A new high viscosity accessory for the Goodeve thixoviscometer (Griffin and Tatlock, Ltd.) now makes it possible to measure viscosities between one centipoise and one megapoise over a wide range of rates of shear. Among other new apparatus shown by this company were Beckman *p*H meters (accurate thermionic valve meters designed with close attention to convenience in operation and freedom from errors due to electrostatic effects); a semi-automatic moisture test oven; and a wide range of microchemical apparatus.

The Teddington automatic temperature controller (The British Thermostat Co., Ltd.) is for use with either electric or fuel-fired furnaces, the latter being regulated through mag-

netic or motor-operated valves. It is available with movements suitable for any of the usual electrical heat-sensitive devices such as resistance elements, thermocouples or radiation tubes. The control mechanism is characterised by the simplicity of its construction, the arrangement being such that positive operation of the mercury switch is obtained with a negligible amount of force being transmitted to the measuring system. In the Teddington humidistat a strip of hygroscopic material of negligible temperature coefficient is held under tension, and its expansion or contraction with change of humidity operates a switching mechanism. It is available in forms for controlling either one or two electrical circuits, the switches being arranged either to open or to close on increase of relative humidity. The British Thermostat Co., Ltd., also showed the Teddington STAF thermostatic expansion valve. This is an automatic valve for controlling the flow of liquid refrigerant, allowing the maximum amount which can be evaporated under the prevailing conditions to enter the evaporator.

Among several new instruments exhibited by the Bausch and Lomb Optical Co., Ltd., was the A.K.S. equipment, a new feature in the range of wide-field binocular microscopes. This model is so designed that it may be used as an ordinary bench microscope, or as a long-arm binocular microscope. In this equipment, a range of magnification is possible from 3.7 × to 150 ×. The company also showed a new range of laboratory microscopes having ball bearing fine adjustments.

An automatic liquid level control (Londex, Ltd.) consists of a small float of magnetic material which passes through a coil, the latter fitted to the outside of a tube. As soon as the float passes through the coil, the impedance changes and a sensitive relay makes and breaks the control contacts of the pump switch gear. This type of control is used especially for high pressures (300 atmospheres) but, besides this, it has many other applications.

Included in the exhibits of Bakelite, Ltd., were specimens of shaped laminated sheet, and other laminated materials of different types in the form of sheet, rod and tube; Bakelite Plybond, a new adhesive for bonding the plies of plywood; and primer bases.

The Dielcometer (H. S. Simons) is used for tests on any kind of substances in all cases in which the determination of capacity of the test sample can give some characteristic indication as to the physical or chemical state of the sample. Characteristic Dielcometric tests are: measurements of dipole moments; moisture determinations in any kind of substance either by direct measurements, or by extraction, or immersion methods; concentration analysis of binary mixtures, or, under given circumstances, mixtures of more than two components; measurements of the stage of polymerisation, condensation, or ageing; tests during chemical reactions, even carried out inside the reaction vats and indicated at a distance; control of processes such as distillation, extraction, adsorption, or impregnation; tests on purity, identity, or adulteration of raw materials, intermediate and finished products, etc.

Increased Production and Consumption of Fertiliser Nitrogen

Report of British Sulphate of Ammonia Federation Ltd.

THE annual report of the British Sulphate of Ammonia Federation, Ltd., for the year ended June 30, 1938, states that the past year was the forty-first year of propaganda work undertaken successively by the Sulphate of Ammonia Committee, the Association, the Federation, Nitram, Ltd., and Imperial Chemical Industries, Ltd.

During the year under review it is estimated that there was an increase of 183,000 metric tons of nitrogen, or about 6.8 per cent., in the actual production of the forms of nitrogen for which statistics are given. The production in Chile increased by 18,000 tons, or 9 per cent., and output in other countries increased by 165,000 tons, or 7 per cent. 1937/38 was a record year for the output of most of the products enumerated. As in the previous year, the most marked increases in the output of manufactured nitrogen have been in Germany and the Japanese Empire; but in the U.S.A. there was a decrease. Synthetic nitrogen plants have on an average operated at only about 53 per cent. of capacity during the year: the world production capacity for synthetic nitrogen, including cyanamide, is estimated at roughly 4,100,000 tons of nitrogen.

The total consumption increased by 141,678 tons, or about 5.2 per cent., following an increase of 11.9 per cent. last year. The increase in fertiliser nitrogen consumption was 123,000 metric tons, or 5.2 per cent. as compared with 12.5 per cent. in the previous year. Each main class of fertiliser showed an increase; ammonium sulphate (including ammonia for mixed fertilisers) increased by 59,421 tons of nitrogen, or 5.1 per cent. over the 1936/37 figure, Chile nitrate by 14,122 tons (5.9 per cent.), calcium cyanamide by 10,503 tons (3.7 per cent.), and "other synthetic nitrogen fertilisers" by 52,780 tons (7.5 per cent.). In individual countries the largest tonnage changes in fertiliser nitrogen consumption have been increases in Germany, the Japanese Empire, Spain and Italy, and decreases in the U.S.A. and China. The Spanish consumption is, however, still far below its peace-time level; and in China most of the large advance made in 1936/37 has been lost. The increase in consumption in Europe is very impressive—141,659 tons N for fertiliser nitrogen alone. Almost half of this was due to Germany, which also accounted for about half of the European increase in ammonium sulphate and three-quarters of that in other synthetic nitrogen fertilisers. Of the decrease in the consumption of fertiliser nitrogen in the American continent (35,459 tons N) about 90 per cent. was in the U.S.A.

The order of importance in the production and consumption of nitrogen for agricultural use remains roughly as in recent years, viz.: ammonium sulphate 47-48 per cent. of all fertiliser nitrogen; cyanamide 12 per cent.; Chile nitrate 9-10 per cent.; lime ammonium nitrate ("Nitrochalk" forms) 9-10 per cent.; calcium nitrate 7-8 per cent.; sodium nitrate (for fertiliser) 3 per cent.; and other synthetic nitrogenous fertilisers 11-12 per cent. The international agreements mentioned in earlier reports have been renewed for a further period of 3-5 years.

Home consumption of sulphate of ammonia showed an increase on the 1936-37 figures of 1,300 tons, or 0.6 per cent., following an increase of 2.1 per cent. in the previous year. Prices were 9s. per ton higher than in the previous year. The increase in the consumption in England and Wales was 3.5 per cent. and in Scotland 1.4 per cent., but in Ireland there was a decrease of 9.4 per cent. The total consumption of pure nitrogen in the British Isles for agricultural purposes amounted to about 68,200 metric tons against 65,700 tons last year, an increase of 3.8 per cent. Total exports of ammonium sulphate from Great Britain and Ireland show an increase of 44,711 tons or about 18 per cent. on last year's figures.

Industry "Goes West"

Progress at Welsh Trading Estate

THAT an industry is "going west" is not always a reference to its extinction, for as applied to the Treforest Trading Estate, it indicates a new security. One effect of the September crisis was to bring further factories to South Wales which from a strategic point of view is exceptionally well situated.

Other places may be more remote, but remoteness is useless unless an industrial centre has, like Treforest, direct access by road, rail, air and canal to the big markets of Britain and the world. The Bristol Channel is a natural and safe outlet for merchandise to the Seven Seas, and the proposed revival of activity of Pembroke Dock (which is likely to become an important civil air base for Western Ocean traffic) is but another sign of how industry is "going west."

Work on the Treforest Estate was commenced on New Year's Eve, 1936, and two years later thirty-eight factories had already been erected. Thirty-two are in production, employing 1,000 workpeople, and a further twenty factories are in course of erection. Work on the construction of the estate is employing 600 men, and among the achievements so far has been the bridging of the River Taff to bring the railway to the estate.

Adaptability of the Labour Available

One of the alleged drawbacks to South Wales has been the absence of skilled labour. Less than two years ago there were critics who said: "There are plenty of unemployed, but when they worked it was in the heavy industries of coal, steel, shipping. We cannot afford to employ people in light industries who have no idea of the more intricate types of factory work." Experience has, however, shown that the miner is thoroughly adaptable. In one of the bigger factories, using a new process requiring an exceptionally high standard of efficiency in its workpeople, the managing director recently told the Estate company: "The men are a fine lot—loyal, keen, intelligent, and remarkably quick to learn. And once learnt, a thing is never forgotten." Generally speaking, employers find it satisfactory to give unskilled workpeople a chance of learning a semi-skilled occupation in the firm's time immediately they begin to become accustomed to the new surroundings of a factory and to its corporate life.

Firms now operating on the Treforest Trading Estate include: Carbo-Ice Industries, Ltd. (dry ice), J. Loewenstern, "Denicotea" filters, Cutrilin, Ltd. (chemicals), Treforest Chemical Co., Ltd., and Pearl Varnish Co., Ltd.

PURIFICATION OF METALLIC HYDROXIDES

A method for the purification of the hydroxides of the alkali metals from silicates has been patented by the Belgian firm of Solvay and Cie. It is proposed that these compounds be removed by the action of two reagents, of which one is a hydroxide, a hydrate or a trivalent salt of iron, including the salts of acids derived from FeO, and the other an oxide, hydrate or salt of calcium. This treatment leaves the silicate in the form of an insoluble precipitate which can be eliminated by filtration, etc. The precipitate obtained is probably a complex calcium ferrosilicate. As an example a solution containing 11 grams sodium hydroxide per 100 grams solution, in which 400 millionth parts of silica are present as an impurity, is treated with 0.5 grams of $Ca(OH)_2$ per 100 grams solution, then with 0.34 grams of $FeSO_4$ in 20 per cent. aqueous solution. The mixture was kept at 100° C. for two hours and then filtered. When tested, the solution was found to contain only 40 millionth parts of silica, while the aluminium content, which had been 300 millionth parts before treatment, was reduced by half.

Letters to the Editor

The Five Day Week

SIR,—Shell-Mex and B.P., Ltd. introduced the five day working week for their London office staff in January, 1937, so that by next month, we shall have two years' experience of the experiment.

Any improvement in the conditions of service must benefit the company in that the staff will have added zest to serve the company well, but, apart from such indirect advantages, it must seem at first blush that a reduction in the weekly hours would add to the cost of conducting the company's business.

In actual fact, this has been little, if at all, noticeable and the explanation of this apparent enigma is, I think, that just as the routine worker gets stale and his output suffers correspondingly if he works too many hours at one spell, so also efficiency is lessened if he works too many days at one spell, and a spell of five days is better than one of six.

In London, in particular, the considerable time spent in travelling from home to the office and back again makes the total effort expended on Saturday mornings unjustifiably high in comparison with the amount of work performed at the office and the psychological effect on the staff of that fact cannot be otherwise than bad.

I believe that other organisations which perhaps are hesitating whether or not to introduce the 5-day working week, would be agreeably surprised if they made the experiment.—Yours faithfully,

SHELL-MEX B.P., LTD.
F. L. Halford,
Managing Director.

London.
December 30, 1938.

SIR,—We originated the five day week of eight hours each in our factory in 1932, and have been gradually extending it through all departments ever since. All this has been done in close association with the trade union concerned, The Transport and General Workers, and the action was concurrent with the introduction of scientific planning. We have found the scheme very satisfactory, and we do not think that any of the workers would care to go back to the old six-day week of 47 hours. The advantages in the direction of health and absences have been considerable, and from a business point of view we are also satisfied with results obtained.—Yours faithfully,

MANDER BROTHERS, LTD.
Geoffrey Le M. Mander,
Chairman.

Wolverhampton.
December 29, 1938.

INCREASED SULPHUR CONSUMPTION IN GERMANY

Owing to heavily increased requirements, chiefly by the cellulose fibre industry, the consumption of sulphur in Germany continues to rise considerably. It is now estimated that 120,000 tons are used annually, but the increase is no longer reflected in import statistics as the home industry is now capable of producing about 90,000 tons of sulphur per year. Production from coke-oven gases, formerly almost the only source of sulphur, has expanded to a notable degree. From a production of 9,000 tons in 1927 it has risen to 29,000 tons in the course of ten years and there are indications that the complete 1938 output will be revealed eventually at 50,000 tons. It is expected that coke-oven gases will be able to supply 60,000 tons of sulphur in 1939. The now established industry for producing motor spirit by the hydrogenation of brown coal has also become an important source of sulphur. The Leuna works of the I.G. will probably supply 40,000 tons during 1938, compared with less than 20,000 tons in 1936, and far smaller amounts during the preceding year. The Leuna works obtains its output from synthesis gases by application of the "alkacid" process.

Water Emulsion Paints*

By
E. BEVAN, B.Sc.

THE literature available on this subject is very scanty and it would thus appear that the manufacture of water paints is largely an art to which no specific rules can be applied, each set of materials requiring individual treatment.

A survey of the main advantages of water paints indicates that these are:—Cheapness, absence of smell, absence of fire risk, use of aqueous dispersed pigment pastes with elimination of grinding and lower application costs. There are two classes of water paints—those which produce homogeneous films on drying and those which give heterogeneous films. Most existing water paints are of the latter type, and are usually preferred for appearance. By the use of a water resistant vehicle in the disperse phase of an emulsion paint, it is possible to obtain a flat, durable paint which can be applied to damp plaster and concrete surfaces and is capable of exterior application. On the other hand, glossy films which harden and give unsoluble paints can be prepared. In these the pigment, previously water wet, becomes oil wet and is uniformly dispersed in the oil phase. Though this latter type is somewhat unorthodox, since low pigment vehicle ratios are used. This is necessary to obtain maximum gloss and ensure complete wetting of the pigment by the disperse phase, and to obtain stability of the emulsion for brushing. While unorthodox, this type of paint appears to offer advantages in smoothness, hardness, and washability, all of which are comparable with an enamel or gloss paint.

Interesting Possibilities of Alkyd Resins

Dealing with homogeneous films produced from aqueous solutions rather than aqueous emulsions, the use of water soluble materials giving insoluble films seems attractive and gave rise to investigation on the use of ammonium salts of alkyd resins. Though it was found possible to prepare such ammonium compounds with straight alkyd resins, any modification with drying fatty acids results in there being present too few carboxyl groups to allow the formation of a suitable compound. By combining the resin with maleic anhydride a suitable compound is formed which, when used with ammonia, gives the necessary flexibility and hardness in the dried film. Such paints, though not used commercially, have possibilities which are worth following.

While most water paints used in this country are of the oil in water emulsion type, they are practically non-existent in America where casein is used mostly as the basis of a film forming vehicle. Great advances have been made in America on the use of this material and many processes patented by Mr. F. Abwood produce casein solutions in which the casein is present in a gel-like condition, but with flow properties, and which resist the forces of decomposition and putrefaction. These paints are heterogeneous in nature and produce films of high adhesive properties, and resistant to washing in the presence of lime. It is found, however, that casein has the fault that it is not sufficiently flexible when applied to a non-rigid surface and it contracts on ageing. With this in view, it would seem that excellent paints could be made by combining casein and alkyd resins in a stable emulsion.

Considering the growth in the use of synthetic resins and their suitability as paint films, the logical development was to investigate their possibilities when emulsified with water. Having selected the resin to test, it is necessary to consider the method of emulsification. This is where no general rules can be applied, and special procedure must be developed. This is best shown by the fact that variations in procedure gave rise to two types of emulsion from the same materials. In one case, it was of uniform, small particle size and in the other the size of particle was up to 30-40 times larger and uneven. The two emulsions showed very different characteristics in the type of paint they produced when pigmented. The fine emulsion gave a paint of the typical distemper finish, whereas the latter coarse emulsion gave rise to a smooth, good flowing paint of an oil enamel type, which had greater resistance to washing. When heavily pigmented, the fine emulsion stood well, and would brush, but the coarse one was broken and lost its flow, and furthermore settled badly on storage.

An explanation of these points was available from a microscopic examination which showed the pigment to be differently disposed and that while in the former case it was present in the water phase, in the latter it was to be found at the interface or actually inside the larger particles of the disperse phase. In order to examine whether the method of introduction of the pigment accounted for this behaviour to some extent, different experiments were carried out in which the pigment (lithopone) was pre-wetted with: (a) water and (b) alkyd resin. The results, however, were not very conclusive, but tended to show that the emulsion plays a larger part in the location of the pigment than any pre-treatment of the pigment.

The production of emulsion water paints has been developed largely on the lines of highly pigmented paints. The introduction of semi-gloss finishes on synthetic resins is somewhat unorthodox, and necessitates some modifications in formulation to obtain the desired results. From the experiments it is clear that the particle size of the emulsion and the position of the pigment are largely responsible for the finish obtained.

* Abstract of paper presented at a meeting of the Manchester Section of the Oil and Colour Chemists' Association.

Activated Carbon

High Yield from Pine Sawdust Impregnated with Boric Acid

ACTIVATED carbons in 33.5 per cent. yield have been prepared from dried pine sawdust which has been impregnated with boric acid, in contrast to a yield of only 19 per cent, when the boric acid is omitted, according to G. Lambris and H. Boll (*Brennstoff Chem.*, 1938, *19*, 177-84). The sawdust was heated to 1,000° C., with exclusion of oxygen, and the boric acid was subsequently leached out. Activation was then effected at 950° C. in a vertical tube furnace in a current of carbon dioxide, the direction of flow being reversed periodically. The amount of carbon consumed and carbon monoxide formed gave an index of the comparative activity of different batches. Testing of the activated product was done by using a 0.15 per cent. solution of methylene blue, results being expressed as the volume of solution decolorised by shaking for five minutes with 0.1 gram of the charcoal. The volume of solution discharged increased with increased carbon consumed during the activating phase of the process. Maximum activity was 1.25 gram methylene blue per gram of charcoal, compared with 1.30 methylene blue in the case of alkali-activated charcoal.

In a report of the State Institute for Applied Chemistry of the U.S.S.R., Klebanski and Tschewytschalowa describe a new method for the production of β-chloropropionyl chloride (*Trans. Sci. State Inst. Appl. Chem.* U.S.S.R. *31*, 46). In the reaction of C_2H_4 with $CoCl_2$ in a toluene solution in the presence of $AlCl_3$, only a small proportion of the β-chloropropionyl chloride is formed. By the use of carbon disulphide as a solvent instead of toluene, the chloride was obtainable in good yield.

Death of Mr. Emile Mond

Outstanding Personality of the Chemical World

MR. EMILE MOND, chairman of the South Staffordshire Mond Gas Co. and the Power-Gas Corporation, Ltd., died on December 30, at the age of 73. He was a nephew of the late Dr. Ludwig Mond and a cousin of the late Lord Melchett and Sir Robert Mond. He received the first part of his education in Paris, and later took his diploma in chemistry at the Polytechnic in Zurich. He began his technical career in England with Brunner, Mond and Co., but he left the firm for a short time to found the West Indies Chemical Works in Jamaica with Dr. Emile Bucher, of Geneva. Subsequently he returned to England and became technical secretary to his uncle, Dr. Ludwig Mond, and later joined the board of Brunner, Mond and Co., Ltd., and the Mond Nickel Company, Ltd., of which firm he became vice-chairman. He was also chairman of Ashmore, Benson, Pease and Co., Ltd.

Mr. Mond was hon. treasurer of the Chemical Society and of the Faraday Society. He took a deep interest in the

The late Mr. Emile Mond

Institut Français du Royaume Uni from the time of its formation by Mme. Marie Bohn. He was created an Officer of the Legion d'Honneur by the French Government and an Officer of the Ordre de Leopold by the King of the Belgians. In memory of his eldest son, Captain Francis Mond, who was killed while flying in France in 1918, Mr. Mond established the Francis Mond Professorship of Aeronautical Engineering at Cambridge University.

Memorial Service

A memorial service was held at St. James's, Piccadilly, London, on Tuesday. Among those present were Mr. W. A. S. Calder (representing Lord Leverhulme and the Society of Chemical Industry), Sir William Bragg, Sir Gilbert Morgan, Professor C. S. Gibson (representing Sir W. J. Pope), Mr. E. R. Bolton, Mr. E. J. Burman (representing Dr. R. Lessing), Mr. Francis H. Carr, Mr. S. E. Carr, Mr. F. W. Clifford, Dr. W. Cullen, Mr. L. H. Cooper, Professor F. G. Donnan, Dr. H. J. T. Ellingham, Major F. A. Freeth, Dr. T. A. Henry, Professor J. T. Hewitt, Professor I. M. Heilbron, Mr. J. E. James, Dr. L. A. Jordan, Mr. Montague Keen, Dr. L. H. Lampitt, Dr. Stephen Miall, Mr. J. G. Nicholson, Mr. E. A. Nicholson, Professor J. R. Partington, Professor J. C. Philip, Mr. Philip C. Pope (representing Mr. W. Edgar Hale, director, South Staffordshire Mond Gas Co.), Professor Jocelyn F. Thorpe, Mr. Albert W. Tangye and Mr. Albert Van den Bergh.

New Road Marking Material

Based on Plasticised Resinates

A PLASTIC material, suitable either for road surfaces or for coloured markings thereon, has been patented in France by the S.A. des Produits Colorants et Plastiques. (F.P. 826,311). Resinates formed from the combination of metallic oxides with resins, particularly colophony, melt at higher temperatures than the colophony itself. These resinates, however, are brittle and hence not very suitable for road surfacing. It is possible, the patent states, to plasticise these metallic resinates by the addition of hydrocarbons, notably rubber, and treatment with sulphur or sulphur chloride. Instead of rubber, siccative oils may also be used.

An example of a possible mixture is given as 250 grams colophony, 150 grams zinc resinate and 50 grams turpentine, in which 2.5 grams of crêpe rubber has been dissolved. The colophony is first melted by heating to 80° C., being constantly stirred during the process. To this the zinc resinate is added, the temperature being raised to 160° C. to melt the resinates. The turpentine solution of rubber is then added, and the temperature allowed to drop back to 130° C. To this a quantity of powdered pummice filler, previously treated with sulphur chloride or with sulphur chloride and carbon disulphide, is added. A quantity of basic colouring matter can also be added to the mixture if desired, red violet being obtained with fuchsine or rhodamine, yellow with auramine or methylene yellow, blue with methylene blue or indanthrene, and green with Russian green. The mixture will solidify at about 70° C. and forms a surface which is as resistant to wear as any one of the ordinary road surfaces. For the preparation of a non-skid surface, the material may be mixed with sand or gravel.

Norway's Fertiliser Products

Export Fluctuations

The Department of Overseas Trade's report (H.M. Stationery Office, 2s. net) on the economic and commercial conditions in Norway states that from January to July, 1938, Norway's principal exports of chemical and electro-chemical products were:—nitrate of lime, etc., 155,288 metric tons (as against 130,886 for the corresponding period in 1937); cyanamide, 18,925 (19,898); nitric acid, concentrated, 4,418 (4,451); calcium carbide, 24,699 (21,333); nitrate of soda, 11,523 (26,137), nitrate of ammonia, 1,480 (4,429). Total exports of artificial fertiliser rose from 388,483 tons (valued at 42.5 million kroner) in 1935 to 464,074 tons (51.4 million kroner) in 1936, but dropped to 390,478 tons (43.9 million kroner) in 1937, nitrate of lime being mainly responsible for the fluctuation.

Exports of concentrated nitric acid increased considerably in both 1936 and 1937, and Sweden and the United Kingdom were the chief consumers. The export of soda was new, but it progressed rapidly from 1935 to 1937; Sweden bought most of it and a little went to Belgium. In the case of calcium carbide, exports, of which the bulk goes to the United Kingdom, increased substantially in 1937 and a large quantity was used for the production of cyanamide. The production index (1935=100) for the chemical and electrochemical industries as a whole was 102.1 in 1936, 104.7 in 1937 and 120.8 in the first half of 1938: for June, 1938, it was 116.6. The estimated value of output was practically the same in 1935 and 1936, and a rise of about 16 per cent. in 1937 was less than the rise in volume since 1935.

A NEW shale oil plant put into operation at Sillamäe by the Esthonian Oil Consortium brings the annual production capacity of the company to 60,000 tons of oil as compared with a potential output of 200,000 tons by the entire Esthonian shale oil industry.

Glass Research

Papers Presented at Meeting of Society of Glass Technology

AT the 198th ordinary general meeting of the Society of Glass Technology held at Leeds University, three papers were presented of which the following are abstracts.

A Study of the Possibility of Eliminating Iron from Molten Soda-Lime-Silica Glass by the Action of Chlorides. By H. M. Bateson and Professor W. E. S. Turner.

After briefly reviewing previous work on the use of chlorides for volatilising iron, Mr. Bateson described work done at the Department of Glass Technology at Sheffield.

Following preliminary melts in sillimanite pots, the glasses were melted in platinum in a gas fired furnace at 1,400°. Precautions were taken to keep the furnace atmosphere as constant as possible. The base glass had a composition :— SiO_2 75 per cent., Na_2O 15.8 per cent., CaO 9.2 per cent. To the base glass iron oxide was added in amounts to yield 0.1 and 0.2 per cent. Fe_2O_3. Chlorides equivalent to 0.2 and 0.4 per cent. Cl were also added in the form of sodium chloride, ammonium chloride and potassium chloride. In a further series of glasses, pure ferric chloride was added to the base glass to give an equivalent of 0.1 and 0.2 per cent. Fe_2O_3 in the glass. A photo-electric cell was used for expressing the variation in colour transmission obtained. Graphs of cell reading against iron oxide content showed the difference in transmission obtained very clearly.

From the preliminary melts, it was apparent that sodium-chloride containing glasses were not as well refined as glasses containing ammonium chloride. Both types of glasses were less seedy than those containing no added chloride. Glasses to which ferric chloride was added appeared similar to those containing iron oxide alone. The addition of chlorides had no marked effect on the melting rate.

The actual amount of iron oxide eliminated was not large, ammonium chloride being the most effective of the salts tested. Sodium chloride eliminated approximately 8 per cent. of the iron oxide; potassium chloride 10 per cent., and ammonium chloride 16 per cent. The efficiency of iron removal decreased with increase in the melting point of the added chloride. When finally assessing the value of the results, the difference between small melting and industrial practice should not be overlooked.

Increase of Breaking Strength by Sulphuring

The Effect of Annealing in Sulphur Dioxide on the Modulus of Rupture of Sheet Glass. By J. Boow and Professor W. E. S. Turner.

The specimens were narrow strips of sheet glass, cut in the direction of drawing of the sheet. These strips were ground and polished on each edge to a standard width of 0.8 cm. The specimens were supported on two vertical and parallel knife edges and broken by applying a load to a central knife edge.

As a result of preliminary tests at 530°, it was shown that the sulphuring process gave a definite improvement in the breaking strength of the glass. This increase was associated with an increase in the complexity of the fractures formed.

The influence of temperature on the amount of bloom formed after sulphuring for two hours was such that there was a gradual increase in the attack up to 490°, but, corresponding to the decrease in viscosity which takes place, there was a much larger deposit formed in the annealing range. Repeated treatments with sulphur dioxide gave a large decrease in the amount of bloom and served to substantiate the statement of Coward and Turner that the formation of further layers of bloom seemed to depend on the slow, and at first apparently constant, rate of diffusion of further supplies of alkali from the body of the glass.

The improvement in strength obtained with sulphuring coincided with the large increase in the amount of bloom deposited in the annealing range. A minimum deposit of 2 mgms of SO_3 per sq. dcm. was required before there was any appreciable increase in strength.

To obtain the maximum strengthening effect of annealing in sulphur dioxide atmospheres, the glassware should be brought into contact with the gases at as high a temperature as possible. Thus, with open fired, or artificially sulphured lehrs, the use of a high annealing temperature had two advantages, for it increased the efficiency of annealing and tended to give ware of great strength.

Effect of Basicity on Colour

The Influence of Basicity on the Colour of Soda-Lime-Silica Glasses containing Iron Oxide or Manganese Oxide. By M. Manners, A. J. Holland, and Professor W. E. S. Turner.

In practice, dark green glasses containing iron oxide or mixtures of iron oxide and manganese oxide were important. These glasses had both lime and soda as their chief basic constituents. For application to this special branch of glass-making, a systematic study was made of the effect of changing composition on the colour of glasses containing a constant percentage of the separate colouring oxides, iron oxide and manganese oxide.

The glasses were melted from Fontainebleau sand, Dowlow limestone, commercial soda ash, calcined alumina, pure iron oxide or pure manganese dioxide. Preliminary melts in sillimanite, in a gas fired furnace at 1,400°, were unsatisfactory owing to inhomogeneity of the glass and the instability of the furnace conditions. Relatively small changes in furnace atmosphere were accompanied by larger changes in colour than obtained with the variation in composition studies. Accordingly, the glasses were melted in platinum, in an electric furnace at 1,400°. Great care was taken to ensure thorough mixing of the batch and the maintenance of a constant time factor in the melting and annealing schedule.

All glasses contained 3 per cent. Fe_2O_3 or 3 per cent. MnO_2. 2 per cent. of alumina was also present in all glasses. Of the main constituents silica, lime and soda, one was kept constant and the other two varied. The range of compositions studied was SiO_2, 66-74 per cent.; CaO, 18-10 per cent.; Na_2O, 18-10 per cent.

Visually, the colour change obtained with variation in composition was slight. But this change could be summarised :

(1) As soda replaced silica, the percentage of lime being constant, the blue component of the iron green colour and of the manganese red colour was increased.

(2) As soda replaced lime, the silica being constant, the blue component was again increased.

(3) As lime replaced silica, the soda being constant, the yellow component of the iron green colour and of manganese red colour was increased.

NEW YEAR GREETINGS

Among the New Year greetings we have received are those from the Drayton Regulator and Instrument Co., Ltd., who enclose a replica of the cover of their "easy reference" catalogue and express the wish that 1939 will bring "fewer plant troubles, lower steam costs and higher production"; the Government Soap Factory, Bangalore, whose greeting took the novel form of colourful wooden figures illustrating the various styles of dress of Indian women; S. Briggs and Co., Ltd., Burton-on-Trent, who have sent a desk blotter with a combined diary and calendar attached; Clayton Aniline Co., Ltd., whose wall calendar is a magnificent production, over two feet long by 20 inches across, which reproduces in full colour E. Berne-Bellecoar's picture "The Petition"; and Carty and Son, Ltd., who have sent a useful refill calendar.

Personal Notes

MR. F. H. ROGERS has been nominated for election as President of the Institution of Chemical Engineers.

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MR. ROBERT STEWART, of West Kilbarde, Ayrshire, dyer and cleaner, left personal estate valued at £41,455.

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MR. JAMES CASSIE FERGUSON, sole partner of Robert Ferguson and Sons, dyers, left personal estate valued at £31,541.

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MR. S. C. WARREN, London, has been appointed chemist and bacteriologist to the Chesterfield and Bolsover Water Board.

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MR. A. I. RONDER, M.P.S., superintendent chemist of Dunfermline Co-operative Society, Ltd., has been elected a member of the Incorporated Sales Managers' Association of Great Britain.

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MR. EDWARD BARON, who has retired on pension from Lever Bros., Port Sunlight, Ltd., after completing 52 years in the soap-making industry, was presented with a cheque for £50 by the directors of the company.

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LT.-COL. J. H. M. GREENLY, president of the Institute of Fuel, has been elected chairman of the new advisory panel of industrialists set up by the Prime Minister to help in the development of the rearmament programme.

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MR. FRANCIS D'ARCY COOPER, chairman of Lever Brothers and Unilever, Ltd., underwent an operation on Monday. It is understood that he will be away from business for some time and will have to undergo a further operation shortly.

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MR. GEOFFREY A. N. HIRST, chairman and governing director of Hirst, Brooke and Hirst, Ltd., has been elected chairman of the County Advisory Committee for Advanced Chemistry under the authority of the Yorkshire Council for Further Education.

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MR. J. W. VINCENT, refinery manager at Shell Haven Refinery, Ellesmere Port, who took over on Monday the position of general manager of Shell Refineries, Ltd., at Stanlow, was made a presentation by the staff. MR. H. MAKEY, whom Mr. Vincent succeeded, is taking over an important position for the company in London.

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MR. ROBERT D. DANKS, manager of Broxburn Oil Works, Scottish Oils, Ltd., retired last week after 56 years' service. In 1921 he was appointed manager of Roman Camp Works, and in 1927, manager of the entire Broxburn Works. On December 29 he and Mrs. Danks were made presentations by Mr. Alex Frame, B.Sc., who has been appointed to succeed Mr. Danks.

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MR GEORGE B. BROOKS, F.I.C., chief chemist of the British Aluminium Co., Ltd., for 18 years, retired under the 65 years age limit recently. Under his guidance the research and analytical laboratories at Kinlochleven developed at a surprising rate to become of the utmost importance in the production of aluminium, his work in this connection leading to his election as a Fellow of the Royal Society of Edinburgh. A native of Sheffield, Mr. Brooks was at one time a lecturer at Sheffield University.

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DR. SAMUEL COLVILLE LIND, dean of the Institute of Technology of the University of Minnesota, has been elected president of the American Chemical Society for 1940. DR. E. R. WEIDLEIN, director of the Mellon Institute of Industrial Research, Pittsburgh, MR. THOMAS MIDGLEY, JR., of Worthington, Ohio, vice-president of the Ethyl Gasoline Corporation, and PROFESSOR ARTHUR J. HILL, chairman of the chemistry department of Yale University, have been elected directors of the Society.

NEW YEAR'S HONOURS LIST

MR. HORACE BARRATT DUNNICLIFF, chief chemist of the Central Revenues Chemical Services, India, and principal of the Government College, Lahore, was awarded the C.I.E.

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SIR WILLIAM PETER RYLANDS, former president of the Iron and Steel Institute and of the National Federation of Iron and Steel Manufacturers, was created a baronet in the New Year Honours List.

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SIR FRANK EDWARD SMITH, F.R.S., secretary of the Department of Scientific and Industrial Research and former secretary of the Royal Society, was awarded the G.B.E. (Civil Division).

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MR. EDWARD JAMES GEORGE, a director and general manager of the Consett Iron Co., Ltd., MR. JOHN GEORGE HAY, a member of the International Rubber Regulation Committee, and PROFESSOR ROBERT ROBINSON, F.R.S., Waynflete Professor of Chemistry of Oxford University, were created Knights Bachelors.

OBITUARY

DR. JOHN T. DUNN, J.P., a former president of the Society of Chemical Industry and of the Society of Public Analysts and Other Analytical Chemists, died at Newcastle-on-Tyne on Tuesday at the age of 80.

He was educated at the College of Physical Science (now Armstrong College), Newcastle-on-Tyne, and was demonstrator and temporary professor of chemistry at the College from 1877 to 1882. From 1882 to 1894 he was science master and later headmaster at Gateshead School. After spending a year as head of the Plymouth Technical School, he became principal of the Northern Polytechnic, Holloway, in 1895 and held the position until 1901. For over 30 years he was a partner in the firm of J. and H. S. Pattinson, analytical and consulting chemists. Before becoming president of the Society of Chemical Industry, Dr. Dunn served on the Council and was a vice-president. He also served on the Councils of the Institute of Chemistry and the Society of Public Analysts and other Analytical Chemists. He was public analyst for Northern Ireland, Newcastle-on-Tyne, Gateshead, Sunderland, South Shields, Tynemouth and Berwick-on-Tweed. In 1899 he published (with V. A. Mundella) a text book, "General Elementary Science," and in 1923, "Pulverised and Colloidal Fuel." Papers by him were also published in the Newcastle Chemical Society's transactions and in the journal of the Society of Chemical Industry.

MR. MENDELSSOHN RICHARD MALSON, Chesterfield general manager of the Patent Electric Shot Firing Company, Ltd., a subsidiary of Imperial Chemical Industries, Ltd., has died at the age of 45.

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MR. CHARLES HALL BETTS, F.R.S., founder of Charles H. Betts and Co., Ltd., bronze and aluminium powder merchants, Birmingham, died recently at the age of 75. He was closely associated with the inception of the British Industries Fair.

TO-DAY'S ANNIVERSARY

HENRY ENFIELD ROSCOE, who first isolated metallic vanadium, was born in London on January 7, 1833. He studied chemistry under three famous men—Graham, at University College, London; Williamson, at the old Birkbeck laboratory, London; and Bunsen, at Heidelberg University—but his scientific life was moulded mainly by the influence of Bunsen. In 1854, Bunsen and Roscoe jointly began their systematic investigation of photo-chemical changes, and their experiments on the combination of hydrogen and chlorine under the influence of light showed that photo-chemical change varies in proportion to the amount of light energy which was absorbed. In 1857 Roscoe became professor of chemistry at Owens College, Manchester, where he succeeded Edward Frankland. This college had been recently founded and its ultimate success was due in no small measure to the manner in which Roscoe attempted to make science a matter of popular interest. In 1885 Roscoe became a Member of Parliament, holding his constituency for ten years. Serving ultimately on educational and scientific commissions, he was knighted in 1884 and sworn in as a member of the Privy Council in 1909. He died in 1915, having attained fame from the teaching of chemistry rather than by his original researches.

New Technical Books

CEMENTS AND ADHESIVES (Kitte und Klebstoffe). By Carl Breuer. 3rd edition. Pp. 308. Dr. Max Jänecke Verlagsbuchhandlung, Leipzig, RM 6.80.

The third and enlarged edition of this book publishes, in just over 300 pages, a tremendous number of recipes of various kinds. It is, however, incomplete, and does not give the latest developments in refractory cements. Apart from this, it is an interesting collection for the "old-timer," but not for the scientist.

THE PHYSICAL PROPERTIES OF COLLOIDAL SOLUTIONS. By E. F. Burton. 3rd edition. Pp. 235. London: Longmans, Green and Co. 15s.

In this edition the author has had the assistance of Mrs. May Annetts Smith and their aim has been to accentuate the contribution of the study of colloidal solutions to the confirmation of the basic principles of the kinetic theory of matter. Certain alterations in the order and method of presentation of the subject matter have been made. The chapter on historical background has been rewritten and a new chapter on the forces in the liquids which regulate the size of colloidal particles has been added. One new feature of this edition is a revised treatment of the Brownian movement of these particles and the consequences of the study of their motions. Greater prominence has been given to work on the distribution of colloidal particles in solution, Perrin's law, and the theory of microscopic fluctuations. There is a new chapter on the many methods of determining Avogardo's number which accentuates the great role that the study of colloidal solutions has played in the development of the kinetic theory of matter. Under the heading of the determination of the size of colloidal particles, an account of work on sedimentation and the various forms of ultracentrifuge has been included. In the chapter on electrokinetic phenomena the theory and practical measurement of cataphoresis has been revised and extended.

Recent Trade Literature

THE KESTNER EVAPORATOR AND ENGINEERING CO., LTD., have recently issued leaflet No. 260 (which supersedes leaflet No. 239a) dealing with pumps for handling corrosive liquids. Plunger, small capacity, glandless centrifugal and gland type centrifugal pumps are illustrated in the leaflet.

A number of leaflets has been issued by the GRE-SOLVENT CO. in connection with their product, Gre-Solvent, which quickly removes any trace of ink or grease from the hands of factory workers. The company also feature "Quellet Detergent," a cleanser, water-softener and purifier.

ANKER BROS. AND CO., LTD., recently issued a new prospectus giving details of their labelling machines. It illustrates a few of the main types and normal constructions of the extensive Anker range, and also shows some of the variety of shapes and sizes of containers and labels dealt with by the machines.

WALWORTH, LTD., Southwark, London, S.E. 1, have issued a catalogue and stock list (No. 2) of plumbers' brasswork. A suitable article for practically every requirement can be found in the list which is comprehensive but condensed, and carefully arranged for easy reference. In the manufacture of the articles listed hot metal pressings are used where possible. It is said that they are generally considered to be superior to castings because of their greater strength, and smoother surface inside and outside.

PRICE, STUTFIELD AND CO., LTD., have issued a folder giving particulars of their chemical engineering department. The department is equipped to deal with all problems of solvent recovery, rectification of solvents, air drying, deodorisation, and removal and collection of dusts and mists. The company state that the whole resources of C.E.C.A., of Paris, owners of the "Acticarbone," "Actifilter" and "Actisec" processes, and M. C. L. Mariller, Ing., E.N.I.A., of the "Mariller" process, are at their disposal in the supply and erection of complete plants.

IMPERIAL CHEMICAL INDUSTRIES, LTD., have issued a new brochure entitled "Some Notes on the Use of Pigments in the Paper Trade." It describes the use and gives sample dyeings of some of the more important pigments available for the paper trade. Although some naturally occurring pigments are still widely used for paper colouring, and, indeed, are still regarded as essential for certain purposes, synthetic pigments are now available in such variety as to offer many new possibilities to the paper maker. The brochure deals with ochres and chromes, madder lakes, and synthetic organic pigments.

The December issue of the Heat-Treatment Journal of WILD-BARFIELD ELECTRIC FURNACES, LTD., contains an article on the "Necessity for Control of Steels and their Heat-Treatment," by R. J. Brown, chemist and metallurgist to Morris Motors, Ltd., who deals with the hardening shop, pyrometric equipment, material control, furnace and quenching equipment, defective structures in hardened and tempered steel and case-hardening steels. There is also an article on electrode salt baths and a description of the company's new optical dark room.

THE PATERSON ENGINEERING CO., LTD., are the makers of the RT type of dry chemical feeder, which is the latest development of the Paterson dry feeder, which has long been recognised as an accurate and reliable means of feeding dry, pulverised chemicals and other materials of a granular nature. The machine is described in a brochure in which it is pointed out that Paterson dry feeders have been successfully and extensively used for the application of powdered reagents for water treatment purposes, including sulphate of alumina, sulphate of ammonia, lime, chalk, soda ash, sulphate of iron and activated carbon. Its use, however, is not limited to water treatment and it forms a suitable means for measuring and proportioning any class of powdered or granulated substance.

General News—From Week to Week

THE BRITISH STANDARDS INSTITUTION has revised the B.S. Specification for pipe threads (B.S.S. No. 21).

FIVE WORKMEN WERE BURNED, one fatally, when a vat of varnish at the paint works of Blundell, Spence and Co., Ltd., Hull, boiled over and caught fire last week.

COOPER, MCDOUGALL AND ROBERTSON, LTD., chemical manufacturers, propose erecting additions to their works in Lochburn Road, Glasgow.

A NEW ULTRA-MICROSCOPE which magnifies up to a million times was demonstrated at Richmond, Virginia, last week. This electron microscope is said to show the atom as a brilliant circular area of light, about an inch in diameter.

WORK WILL BEGIN THIS WEEK ON THE ERECTION OF A NEW GRAIN DISTILLERY at Hillside, near Montrose. This is the latest venture of Associated Scottish Distilleries, Ltd., who already own six malt distilleries in various parts of Scotland, including Aberdeen, Stonehaven, Fettercairn and Forres.

THE INTERNATIONAL TIN RESEARCH AND DEVELOPMENT COUNCIL have moved their offices from 378 Strand, London, to Fraser Road, Greenford, Middlesex. New laboratories are in course of erection on the same site and should be in use early this year. Further extensions of the Council's activities are planned.

OUTPUT PER MAN-HOUR IN THE AMERICAN PHOSPHATE-ROCK-MINING INDUSTRY has increased more than nineteenfold since 1880. A report entitled "Phosphate-Rock-Mining, 1880-1937," published by the Works Progress Administration and the American National Research Project in co-operation with the United States Department of the Interior (Bureau of Mines), discusses in detail the many technological improvements which made this increase of productivity possible.

CHARLES PAGE AND CO., chemical merchants, Grosvenor Gardens, Victoria, S.W., and F. W. Hampshire and Co., Ltd., manufacturing chemists, Derby, are the latest British firms to receive claims for alleged debts to the American drug firm, McKeason and Robins, Inc., which is involved in a big business sensation in the United States. Eight Scottish firms, including Cockburn and Co., Ltd., manufacturing chemists, Glasgow, and A. Bell and Sons, Ltd., dyers, Paisley, have received similar claims. All the concerns have denied the debts, and Mr. C. W. Lovegrove, secretary to Charles Page and Co., has written to the other companies suggesting that if denial of indebtedness does not end the matter co-operative action should be taken, perhaps through a Government department.

THE 17TH ANNUAL CORPORATE MEETING OF THE INSTITUTION OF CHEMICAL ENGINEERS will be held at the Hotel Victoria, Northumberland Avenue, London, W.C.2, on February 17 next. The following have been nominated by the Council for the various offices of the Institution: President, Mr. F. H. Rogers; vice-presidents, Sir Harold Hartley and Mr. L. O. Newton; joint hon. secretaries, Mr. M. B. Donald and Dr. A. J. V. Underwood; hon. treasurer, Mr. F. A. Greene; members of Council, Mr. H. J. Bush, Dr. H. W. Cremer, Dr. W. M. Cumming, Dr. L. H. Lampitt, Mr. J. McKillop and Mr. E. W. Smith; associate-members, Mr. W. B. Heaton and Mr. F. E. Warner. A detailed programme of the meeting will shortly be circulated.

THE EXPORT FIGURES for the Cornish china clay industry, during the first eleven months of 1938 show a drop as compared with those for the corresponding period of 1937, which was a record year. However, there is a certain amount of consolation in the hope that the revision of the American tariff on English china clay will benefit next year's exports. Dispatches of china clay, china stone and ball clay totalled 650,782 tons, a decrease of 232,910 tons compared with the quantity handled in 1937. Up to that year there had been a steady annual increase from the low level of 577,543 tons in 1932. Turnover of china clay in the eleven months was 599,200 tons, against 811,960 in 1937; china stone, 32,416, against 41,811; and ball clay, 19,166, against 29,921. Exports for the ten months ended October (china clay only) were 292,584 tons (£551,904), against 444,079 tons (£767,015) in 1937 and 376,225 tons (£635,228) in 1936. Exports to the U.S.A., similarly compared, were 62,801 (£127,483), 118,221 (£223,127), and 108,208 (£191,259). Exports to Germany were fairly well maintained —31,594 tons (£54,513) in 1938, against 39,366 tons (£67,640) in 1937.

GOLD HAS BEEN DISCOVERED in paying quantities over a wide area in Gujerat, India. A mining lease has been taken and a company will shortly be found to exploit the discovery. It is believed that the Bombay Government is interested in the company, which will instal £250,000 worth of plant within three years.

THE CANADIAN DOMINION BUREAU OF STATISTICS reports that sales of fertiliser materials and mixed fertilisers, including exports and excluding sales for the production of mixed fertilisers in Canada, totalled 618,644 short tons durng the year ended June 30, 1938, compared with 587,751 short tons sold during the preceding twelve months.

THE OFFICIAL HANDBOOK AND GUIDE issued by the Government of Mysore in connection with the Mysore Dasara Exhibition, 1938, contains articles on the Fixation of Atmospheric Nitrogen; the Indian Lac Industry by the Hon. Dr. Syed Mahmud; the Mysore Iron and Steel Works; the Kolar Gold Field, Mysore's Minerals and Mineral Industries; and Mysore's industrial activities.

THE AGENT-GENERAL FOR VICTORIA, AUSTRALIA, in London, Mr. Bussau, who recently visited Germany to obtain first-hand information on the production of oil from coal, has reported that it is possible to produce oil from Victorian brown coal at 1s. a gallon. The report has quickened interest in the Federal proposal to supplement the emergency petrol supplies by substitutes or storage which will be considered by the Federal Cabinet this month.

A CONFERENCE BETWEEN THE PROMOTERS of the proposed Flintshire £1,000,000 carbide works was held in London last week. Mr. G. O. Williams, chairman of the Flintshire Industrial Committee, stating afterwards that most of the difficulties in the way of arriving at a complete solution had been overcome, but as there were still important questions involved a further meeting would be held next week. It was in April last that the Flintshire Industrial Development Committee approved a scheme for a calcium carbide factory to employ 1,500 men, on the Flintshire coast, near Holywell.

MR. ALFRED G. HOWARD, chairman, Howards and Sons, Ltd., in a letter to *The Times* on Monday, mentioned that the jubilee of the iodine preparations combination was celebrated last month. He pointed out, in view of the fact that the subject of trade conventions was so prominently before the public, that the combination was not an example of a trade amalgamation but of an agreement between a number of independent English, French and German firms to promote order and well-being in the manufacture and sale of iodine preparations. This, with a necessary suspension during the War, had a history of 50 years of smooth and amicable working.

EXMOUTH URBAN DISTRICT COUNCIL are inviting tenders for supplies during the year commencing April 1 next, of lubricating and fuel oils, motor spirit, disinfectants, paints and oils, cement, etc. Tenders, on forms obtainable from the surveyor, Mr. H. S. L. Knight, have to reach the Clerk not later than noon on January 20. Tenders are also being invited by Devon County Council for supplies during the twelve months ending March 31, 1940, of bituminous or tar-bituminous compounds, refined tar, Portland cement, explosives, petrol and paraffin, paints, oils, grease, etc. Tenders, on forms obtainable from the Clerk, or the County Surveyors, have to reach the former at the Castle, Exeter, not later than noon on January 18.

New Companies Registered

Chemical Plant and Equipment Company, Ltd. 346,829.—Private company. Capital £2,000 in £1 shares. To carry on the business of chemical technical engineers, consulting engineers, metallurgists, etc. Subscribers: R. C. Howley, 12 Crown Road, Shoreham-by-Sea; R. A. Pedder.

Pharmaceutical Research Institute, Ltd. 347,407.—Private company. Capital £1,000 in £1 shares. To carry on the business of manufacturers of and dealers in chemicals, gases, drugs, medicines, etc. Subscribers: Merle H. Tulett, 11-12 Finsbury Square, E.C.; Albert F. Youthed.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

METHOD FOR PURIFYING SODA LYE in artificial silk factories.—Aktiebolaget Separator. (Sweden, Dec. 18, '37.) 36840.

RECOVERY OF WHALE OIL from glue waters, etc.—Aktiebolaget Separator, Lever Bros. and Unilever, Ltd., and B. R. Bostock. 37156.

RECOVERY OF OIL FROM BONES OF WHALES.—Aktiebolaget Separator, Lever Bros. and Unilever, Ltd., and B. R. Bostock. 37157.

ALUMINIUM REFINING CELLS.—Aluminium-Industrie, A.-G. (Switzerland, Dec. 30, '37.) 36608.

TREATMENT OF IRON, ETC.—American Chemical Paint Co. (United States, May 27.) 37069.

DEPRESSION OF CARBONACEOUS MATERIAL IN FLOTATION.—American Cyanamid Co. (United States, Feb. 1.) 36959.

MANUFACTURE OF SILICA GEL.—Anglo-Iranian Oil Co., Ltd., H. F. Dare, and A. Millien. 36779.

PRODUCTION OF PHENOL-ALDEHYDE SYNTHETIC RESINS.—Bakelite, Ltd. (Germany, Dec. 22, '37.) 36747.

MANUFACTURE OF ZINC WHITE PIGMENTS.—A. Carpmael (I. G. Farbenindustrie.) 36587.

POLYMERISATION OF BUTADIENES-1.3.—A. Carpmael (I. G. Farbenindustrie.) 37049.

MANUFACTURE OF SUBSTITUTED THIOBARBITURIC ACIDS.—H. C. Carrington, and Imperial Chemical Industries, Ltd. (Feb. 2). 36591.

TREATMENT OF ZEIN.—Corn Products Refining Co. (United States, Dec. 20, '37.) 37072.

PROCESS OF, ETC., TREATING FOOD PRODUCTS.—Crown Cork and Seal Co., Inc. (United States, Jan. 19.) 37088.

METHODS OF CARRYING OUT ORGANIC CHEMICAL REACTIONS.—Deutsche Hydrierwerke, A.-G. (Germany, Dec. 18, '37.) 36842.

TREATMENT OF CELLULOSE DERIVATIVES.—Distillers Co., Ltd., H. A. Auden, H. P. Staudinger, and H. M. Hutchinson. (May 3). 36910.

MANUFACTURE OF RUBY GLASS.—E. I. du Pont de Nemours and Co. (United States, Dec. 15, '37.) 36593.

PRODUCTION OF DERIVATIVES OF UREA.—E. I. du Pont de Nemours and Co. (United States, Dec. 17, '37.) 36719.

PRODUCTION OF SYNTHETIC RESINS.—E. I. du Pont de Nemours and Co. (Unted States, Dec. 17, '37.) 36720.

PRODUCTION OF ETHERS of methylol urea.—E. I. du Pont de Nemours and Co. (United States, Dec. 17, '37.) 36721.

MANUFACTURE OF SURFACE-ACTIVE COMPOUNDS.—E. I. du Pont de Nemours and Co. (United States, Dec. 18, '37.) 36927.

MANUFACTURE OF ALKALI METALS BY ELECTROLYSIS.—E. I. du Pont de Nemours and Co., and H. N. Gilbert. 37195.

MANUFACTURE OF ALKALI METALS BY ELECTROLYSIS.—E. I. du Pont de Nemours and Co., and R. E. Hulse. 36594.

STEEL ALLOYS.—Eaton Manufacturing Co. (United States, Dec. 24, '37.) 36598.

CLARIFICATION OF FOULED SPIN BATHS used in manufacture of viscose.—H. G. C. Fairweather (Manville Jenckes Corporation). 37063.

RECOVERY OF SILVER.—J. G. Fife (Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler). 37199.

MANUFACTURE OF FILMS, ETC.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 36928.

CLEANSING PREPARATIONS.—F. G. Francis. 36830.

LUMINESCENT MATERIALS.—General Electric Co., Ltd. (Patent-Treuhand Ges. für Elektrische Gluhlampen). 36685.

ANODIC TREATMENT OF MAGNESIUM, ETC.—C. H. R. Gower, and E. Windsor-Bowen. 36749, 36941.

PRODUCTION OF FAST-DYEINGS.—W. W. Groves. (Germany, Dec. 23, '37.) 37051.

FIXING PIGMENTS, ETC.—W. W. Groves (I. G. Farbenindustrie.) 37147.

LIQUID PREPARATIONS OF POLYMERIC SULPHUR-CONTAINING COMPOUNDS.—C. J. Healey. 36765.

ALLOYS FOR USE AT HIGH TEMPERATURES, ETC.—Heraeus-Vacuumschmelze, A.-G. (Germany, Feb. 1.) 36851; (Germany, Feb. 4.) 36852; (Germany, April 14.) 36853; (Germany, Nov. 5.) 36854.

MANUFACTURE OF CONCENTRATED AQUEOUS SOLUTIONS of medicinal substances.—F. Hoffman-La Roche and Co., A.-G. (Germany, Jan. 10.) 36727.

MANUFACTURE OF TRICHLORACETONITRILE.—I. G. Farbenindustrie. (Germany, Dec. 24, '37.) 36903.

MANUFACTURE OF RUBBER-LIKE POLYMERISATES.—I. G. Farbenindustrie. (Germany, Dec. 16, '37.) 36678.

WORKING UP OF CUPRAMMONIUM CELLULOSE SOLUTIONS.—I. G. Farbenindustrie. (Germany, Dec. 18, '37.) 36740.

MANUFACTURE OF AQUEOUS SOLUTIONS.—I. G. Farbenindustrie. (Germany, Dec. 20, '37.) 36741.

COATING COMPOSITIONS, ETC.—Imperial Chemical Industries, Ltd. (United States, Dec. 16, '37.) 36718.

CONVERTING AMMONIUM SULPHITE-BISULPHITE into ammonium sulphate and sulphur.—I. G. Farbenindustrie. (Germany, Dec. 24, '37.) 37053.

STABILISATION OF HYDROHALIDES.—Imperial Chemical Industries, Ltd. (United States, Dec. 17, '37.) 36925.

MANUFACTURE OF COMBUSTIBLE GAS, ETC., from carbonaceous materials.—Institution of Gas Engineers, and F. J. Dent. 36677.

THERMOPLASTIC COMPOSITIONS.—Lettron-Werk Herberts Kommandit-Ges. (Germany, Dec. 17, '37.) 36667; (Germany, Jan. 6.) 36668.

Complete Specifications Open to Public Inspection

METHOD FOR PREPARING NON-DISCOLOURING VARNISH COATINGS ON WOOD.—E. W. Frenkel (trading as H. Frenkel (firm of)). June 17, 1937. 853/38.

VULCANISATION OF RUBBER.—Wingfoot Corporation. June 19, 1937. 3531/38.

PROCESS FOR MANUFACTURING ANTI-KNOCK MOTOR FUELS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. June 15, 1937. 6744/38.

SOLVENT REFINING OF HYDROCARBON OIL.—Texaco Development Corporation. June 18, 1937. 11861/31.

SEPARATION OF PHENOL AND OXYDIPHENYLS.—Chemische Fabrik von Heyden, A.-G. June 18, 1937. 12703/38.

PRODUCTION OF STARCH GRITS.—International Patents Development Co. June 17, 1937. 12766/38.

MANUFACTURE OF PERFUMES.—I. G. Farbenindustrie. June 15, 1937. 13285/38.

IGNITABLE COMPOSITIONS suitable for example as fuse compositions.—E. I. du Pont de Nemours aod Co. June 18, 1937. 14399/38.

MANUFACTURE OF ARTIFICIAL RESINS.—Albert Products, Ltd. June 18, 1937. 14720/38.

MANUFACTURE OF GASOLINE AND FUEL OIL by cracking crude petroleum stock.—Sinclair Refining Co. June 15, 1937. 14727/38.

REMOVAL AND THE RECOVERY OF SOLVENT remainders from liquids, particularly of selective solvents from hydrocarbon oils and the like.—Deutsche Petroleum, A.-G. June 14, 1937. 15135/38.

ALKALINE DETERGENT PRODUCTS.—Griffith Laboratories, Inc. June 14, 1937. 15317/38.

MANUFACTURE OF ARTICLES which resist intra crystalline corrosion.—F. Krupp, A.-G. June 16, 1937. 15369/38.

WASHING OUT HYDROCARBONS FROM GASES.—Metallges, A.-G. June 16, 1937. 15803/38.

ALKYLATION OF HYDROCARBONS.—Texaco Development Corporation. June 18, 1937. 16092/38.

TREATMENT OF HYDROCARBON OIL.—Texaco Development Corporation. June 18, 1937. 16379/38.

PRODUCTION AND TREATMENT OF SULPHITE.—University of Illinois, Board of Trustees. June 14, 1937. 17181/38.

MANUFACTURE OF AZO DYESTUFFS.—J. R. Geigy, A.-G. June 14, 1937. 17395/38.

COPPER-BASE ALLOYS.—Westinghouse Electric and Manufacturing Co. June 19, 1937. 17589/38.

PRODUCTION OF MAGNESIA.—Dynamidon-Werk Engelhorn and Co. Ges. June 14, 1937. 17654/38.

HARD ALLOYS.—British Thomson-Houston Co., Ltd. June 18, 1937. 17662/38.

ADHESIVES AND THEIR MANUFACTURE.—E. I. du Pont de Nemours and Co. June 16, 1937. 17720/38.

PROCESS FOR THE MANUFACTURE OF COMPOUNDS with cortin-like effect and intermediate products in the production thereof.—Schering, A.-G. June 14, 1937. 17725/38.

ABSORPTION AGENTS FOR CARBONIC ACID, particularly for use in alkali cartridges for respiratory appliances.—O. H. Drager. June 15, 1937. 17794/38.

MANUFACTURE OF CONDENSATION PRODUCTS.—Deutsche Hydrierwerke, A.-G. June 15, 1937. 17839/38.

PRODUCTION AND USE OF POLYISOBUTYLENE MIXTURES.—Siemens-Schuckertwerke, A.-G. June 18, 1937. 17969/38.

TANNING-COMPOSITIONS and their manufacture.—E. I. du Pont de Nemours and Co. June 19, 1937. 17985/38.

ELECTROLYTIC DEPOSITION OF ZINC DUST.—Siemens and Halske, A.-G. June 18, 1937. 18092/38.

TREATMENT OF CARBON BLACK and lamp black.—Columbian Carbon Co. June 17, 1937. 18110/38.

PRODUCING FAST TINTS ON CELLULOSIC FIBRES.—Soc. of Chemical Industry in Basle. June 19, 1937. 18253/38.

ALTERING THE SURFACE TENSION OF AQUEOUS SOLUTIONS, dispersions, and emulsions.—I. G. Farbenindustrie. June 19, 1937. 18255/38.

PROCESS FOR PRODUCING SALT.—M. Randall. June 19, 1937. 18269/38.

PROCESS FOR THE CONVERSION OF NORMALLY GASEOUS HYDROCARBONS INTO LIQUIDS.—Universal Oil Products Co. July 30, 1936. 36763/38.

PROCESS FOR THE CONVERSION OF HYDROCARBON OILS.—Universal Oil Products Co. Nov. 30, 1936. 36829/38.

Specifications Accepted with Date of Application

REFINING OF HYDROCARBON OILS.—Edeleanu-Ges., and F. B. Dehn. June 8, 1937. 496,991.

REFINING HYDROCARBONS.—E. W. Hultman. March 10, 1936. 497,256.

METHOD FOR MANUFACTURE OF A REDUCING GASEOUS MIXTURE.—G. G. Johnston. March 12, 1936. 497,212.

POLYVINYL ACETAL RESINS.—H. E. Potts and Carbide and Carbon Chemicals Corporation. April 9, 1937. 497,146.

RECOVERY OF POLYNUCLEAR COMPOUNDS.—G. W. Johnson (I. G. Farbenindustrie.) April 12, 1937. 497,089.

COMPOSITION FOR INHIBITING THE GROWTH OF RUST ON IRON or steel surfaces.—G. T. Fuery (Knight Products Pty., Ltd.). April 14, 1937. 497,215.

MANUFACTURE OF METAL COMPLEX COMPOUNDS OF POLYAZODYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) May 11, 1937. 497,322.

MANUFACTURE AND PRODUCTION OF AZO DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) June 10, 1937. 497,326.

SOLIDIFYING LIQUID POLYHYDRIC ALCOHOLS, and the solidified products obtained thereby.—G. Snoek. June 11, 1937. 497,263.

PROCESS FOR THE MANUFACTURE OF LEUCO ESTERS of vattable compounds.—A. Carpmael (I. G. Farbenindustrie.) June 11, 1937. 497,327.

MANUFACTURE OF MONO-CHLORONAPHTHALENE.—W. W. Groves June 13, 1936. 497,230.

REMOVAL OF SULPHURETTED HYDROGEN FROM GASES.—De Directie van de Staatsmijnen in Limburg, and Dr. C. Otto and Co., Ges. June 12, 1936. 497,330.

RECOVERY OF HYDROGEN CYANIDE FROM GASES.—De Directie van de Staatsmijnen in Limburg, and Dr. C. Otto and Co., Ges. Sept. 30, 1936. 497,331.

PRODUCTION OF MONO-ALKYLOLAMINES or mixtures containing such amines.—H. E. Girling (Legal representative of H. D. Elkington (deceased)). (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). June 14, 1937. 497,093.

MANUFACTURE OF CARBON BLACK by the electro-thermal decomposition of liquid hydrocarbons.—E. I. du Pont de Nemours and Co., and U. F. Hanson. June 14, 1937. 497,234.

MANUFACTURE OF CEMENT.—C. E. Every (F. L. Smidth and Co. Aktielskab). (Cognate Application, 26657/37.) 497,236.

MAKING SOLUTIONS OF CELLULOSE IN SULPHURIC ACID.—I. G. Farbenindustrie. July 21, 1936. 497,273.

MANUFACTURE OF Δ 4, 5-UNSATURATED β-KETONES of the cyclopentanopolyhydrophenanthrene series.—A. G. Bloxam (Soc. of Chemical Industry in Basle.) June 15, 1937. 497,394.

METHOD OF MANUFACTURING DEXTROSE.—F. B. Dehn (Clinton Co.). June 15, 1937. 497,281.

HEAT-TRANSMITTING MEDIA.—E. I. du Pont de Nemours and Co., A. A. Levine, and O. W. Cass. June 15, 1937. 497,337.

MANUFACTURE OF ISOPROPYL DERIVATIVES OF DIPHENYL.—E. I. du Pont de Nemours and Co., A. A. Levine, and O. W. Cass. June 15, 1937. 497,284.

COLOURATION OF TEXTILE MATERIALS.—R. T. Wrathall, J. Allan, and J. A. Wainwright. June 16, 1937. 497,397.

ACTIVATING BENTONITES.—E. McKellar, and R. R. Cooper. June 16, 1937. 497,097.

TREATMENT OF TEXTILES.—E. Butterworth, B. P. Ridge, Fraser and Haughton, Ltd., and Imperial Chemical Industries, Ltd. June 16, 1937. 497,346.

MANUFACTURE OF COMPLEX METAL COMPOUNDS of polyazo-dyestuffs.—Soc. of Chemical Industry in Basle. June 17, 1936. (Samples furnished.) 497,350.

MANUFACTURE OF SUBSTITUTED BENZENECARBOXYLIC ACIDS.—W. W. Groves (I. G. Farbenindustrie.) June 17, 1937. 497,353.

METHOD OF PRODUCING PLASTICISERS or fillers for rubber goods. F. Rostler, and V. Mehner. Feb. 26, 1937. 497,402.

NITROGEN-CONTAINING ORGANIC COMPOUNDS.—H. A. Piggott, J. D. Rose, and Imperial Chemical Industries, Ltd. June 18, 1937. 497,368.

OBTAINING PURE ADDITIVE COMPOUNDS OF SULPHATE OF ALUMINIUM from impure solutions of aluminium salts.—S. Bretsznajder. June 19, 1936. 497,405.

MANUFACTURE OF AZO DYESTUFFS on the fibre.—A. Carpmael (I. G. Farbenindustrie.) June 19, 1937. 497,407.

PREPARATION OF GOLD FILMS.—C. S. Gibson. June 21, 1937. 497,240.

ALUMINIUM ALLOY.—H. C. Hall. June 22, 1937. 497,241.

PROCESS FOR THE MANUFACTURE OF LUBRICANTS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Aug. 29, 1936. (Samples furnished.) 497,385.

TREATING FABRICS.—Bleachers' Association, Ltd., and P. Ostler. Sept. 1, 1937. 497,298.

METHOD OF TREATING A SUBSTANCE to produce vitamin D therein. A. F. Burgess (Nutrition Research Laboratories, Inc.). Sept. 21, 1937. 497,165.

MANUFACTURE AND PRODUCTION OF ORGANIC ACIDS.—G. W. Johnson (I. G. Farbenindustrie.) Nov. 11, 1937. 497,170.

PREPARATION OF SILICA FOR GLASS BATCHES.—Corning Glass Works, and R. Haddan. Dec. 1, 1937. 497,171.

REFINING PETROLEUM DISTILLATES.—Standard Oil Development Co. March 6, 1937. 497,255.

MANUFACTURE OF ORGANIC PHOSPHATES.—W. J. Tennant (Dow Chemical Co.). Jan. 1, 1938. 497,174.

MOULDING COMPOSITIONS.—W. W. Triggs (Ellis-Foster Co.). Jan. 7, 1938. 497,175.

OBTAINING MAGNESIA WITH HYDROCHLORIC ACID and an alkali sulphate.—W. C. Anderson. Feb. 9, 1938. 497,119.

PROCESS FOR THE MANUFACTURE OF NON-GELATISING SYNTHETIC RESIN SOLUTION.—Deutsche Hydrierwerke, A.-G. March 17, 1937. 497,124.

PROCESS FOR THE MANUFACTURE OF ARTIFICIAL-SILICA STONES.—Nagybatony-Ujlaki Egyesult Iparmuvek R.T. March 5, 1937. 497,125.

AZO DYES.—Chemical Works, formerly Sandoz. April 3, 1937. (Samples furnished.) 497,129.

METHOD OF TREATING CELLULOSE ETHERS.—Kalle and Co., A.-G. April 17, 1937. 497,131.

RUBBER COMPOSITIONS.—United States Rubber Products, Inc. May 15, 1937. 497,137.

MANUFACTURE OF CERAMIC MATERIAL.—British Thomson-Houston Co., Ltd. June 28, 1937. 497,140.

MANUFACTURE OF HARD-METAL ALLOYS.—Naamlooze Vennootschap Philips' Gloeilampenfabrieken. Aug. 9, 1937. 497,144.

Chemical and Allied Stocks and Shares

THE general undertone of the Stock Exchange was firmer this week and on balance numerous leading industrial shares have moved moderately in favour of holders. Owing to the absence of expansion in the volume of business, which remained very small, the tendency was for the better prices to result in profit-taking sales, and earlier gains have not been fully held.

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Nevertheless numerous shares of companies associated with the chemical and allied trades have improved on balance. Imperial Chemical are 30s. 9d. at the time of writing, compared with 30s. a week ago, while Lever and Unilever have put on a few pence to 36s. 9d. Turner and Newall reacted on the rather cautious remarks in the annual report, but are higher on balance at 77s. 6d., which compares with 75s. 9d. a week ago.

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Associated Cement fluctuated moderately, but are 68s. 9d., compared with 67s. a week ago, and higher prices have ruled for British Portland Cement and Tunnel Cement shares. British Plaster Board were moderately lower. British Oxygen, Dunlop Rubber, British Aluminium and Murex were among other shares which have made better prices this week. In the case of Dunlop Rubber the market is prepared for a lower dividend, bearing in mind the statements made in the company's interim report, and estimates of the distribution range up to 7½ per cent. at the present time. Swedish Match shares were fairly steady. In this case the market remains hopeful that dividends may be resumed this year. Imperial Smelting were again slightly higher, aided by the moderate rise in the price of zinc. Fison Packard and Prentice continued fairly active and transferred around 39s.

There was again demand for iron and steel shares and Dorman Long have improved further from 24s. 9d. to 26s. 9d. United Steel were also better, as were Guest Keen, while Baldwins are 6s. 4½d., compared with 5s. 10½d. a week ago. Consett Iron also improved, while higher prices have ruled for Stewarts and Lloyds. Tube Investments and Babcock and Wilcox participated in the upward tendency, but as in most other directions, best prices made earlier in the week were not fully held.

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Boots Drug improved from 39s. to 39s. 7½d., and Sangers were steady at 21s. 9d., while Timothy Whites and Taylors remained around 23s. In other directions Wall Paper deferred made the slightly better price of 33s., and Michael Nairn remained at 60s., awaiting the past year's results. Barry and Staines were again 35s. Pinchin Johnson fluctuated rather sharply on conflicting views as to whether the dividend is likely to be maintained. Other paint shares, including International Paint and Indestructible Paint, were steady. Reckitt and Sons, Cerebos and J. & J. Colman were firm and inclined to improve in sympathy with the general tendency. Goodlass Wall were around 9s. 4½d. Crompton Parkinson have been active now the price is ex the bonus, the assumption being that, despite the larger capital, a dividend of 20 per cent. or more may be possible for the current year.

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Oil shares were more active and most of the leading securities were better under the influence of the decision of the "Shell" and Royal Dutch companies to maintain their interim dividends. Lobitos Oilfields were better.

Weekly Prices of British Chemical Products

TRADE in industrial chemicals during the first week of the New Year was quietly steady, market conditions being affected by the customary period of stocktaking. Deliveries under existing contracts are rather slow although a fair weight of inquiry is reported for new forward business. Caustic potash is now being offered at lower rates, the quotation for the solid 88/92 per cent. being reduced by £2 per ton. The convention quotations for lead oxides continue along steady lines, and elsewhere the price position remains steady and unchanged.

Price Changes

Falls: Potash Caustic, solid; broken (Manchester); Cresylic Acid, 97/99%; Pale, 99/100%; Dark, 95%; Sodium Bisulphite Powder, 60/62%; Lead Acetate (Glasgow); Sodium Prussiate (Glasgow).

Trade in coal tar products is distinctly slow with market quotations more or less stationary at recent levels. A number of export inquiries are in circulation, but the quantities covered are far from substantial. Some improvement is noted in the general tone of the market and active conditions are expected to prevail in the near future.

MANCHESTER.—Quiet conditions continued to be reported on the Manchester chemical market on the resumption of business this week and the position is not expected to be back to normal for some days yet. Few new orders of any consequence have been put through in the leading products. Deliveries against contracts, which, on the whole, have been fairly numerous during the past month, have been no more than moderate, and in this respect, also, it is likely to be some little time before specifications are flowing at all freely. The steadiness of the market has been pretty well maintained, apart from some of the tar products, which have given way slightly here and there. The demand for the latter has shown no appreciable improvement as yet, though there are hopes of better conditions in the near future.

GLASGOW.—On account of the New Year holidays most of the local works have been closed since our last report, and consequently there has been a very limited demand for general chemicals. Prices, however, continue quite steady at about previous figures with no important changes to report.

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground. £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey, £18 10s. per ton, d/d U.K. Fine white, 98%, £17 per ton, d/d U.K.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8¼d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4¼d. per lb. d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 2½d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—10d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0¼d. per lb. MANCHESTER: 1s. 0½d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £19 7s. 6d. per ton f.o.b. SCOTLAND: £19 10s. per ton, less 5%, Liverpool in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £3 17s. 6d. to £4 17s. 6d. per cwt. according to quantity; in drums, £3 10s. 0d. to £4 2s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £29 10s.; brown, £1 per ton less. MANCHESTER: White, £31; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£31 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £31 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £31 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton. SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d. per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.), 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip), 7s.; levig., 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3½d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38 10s.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. SCOTLAND: 5½d. per lb., net, carriage paid.

POTASSIUM IODIDE—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9½d. to 10½d. per lb. SCOTLAND: B.P. Crystals, 10½d. MANCHESTER: B.P. 9½d. to 11½d.

POTASSIUM PRUSSIATE.—5½d. to 6d. per lb. SCOTLAND: 6¾d. net, in casks, ex store. MANCHESTER: Yellow, 6½d. to 6¾d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store

SALAMMONIAC—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £36 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 11s. per ton.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, 13s. 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 15s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 15s.

SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.

SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb net d/d U.K. with rebates for contracts.

SODIUM CHROMATE.—4½d. per lb. d/d U.K.

4d. per lb. GLASGOW: 4½d. net, carriage paid.

SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.

SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 0d. per cwt. in 1-cwt. kegs, net, ex store.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, 9½d. per lb. d/d in 1-cwt. drums.

SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.

SODIUM PRUSSIATE.—4d. per lb. for ton lots. GLASGOW: 4d. MANCHESTER: 4½d. to 5d.

SODIUM SILICATE.—£8 2s. 6d. per ton.

SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.

SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

TARTARIC ACID.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1½d. per lb., 5%, ex store.

ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARYTES.—£6 to £6 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 1d. to 3s. 4d. per lb.

CARBON BLACK.—3⅜d. to 4 1/16d. per lb., ex store.

CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.

CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 10½d. to 11½d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 4¾d. to 5¼d. per lb.; dark 3¾d. to 4¼d. per lb.

LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.

SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.

VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.

ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1939; November, £7 8s.; December, £7 9s. 6d.; January, 1939; £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1939; November, £7 12s. 6d.; December, £7 13s. 9d.; January, 1939, £7 15s.; February, £7 16s. 3d.; March, £7 17s. 6d.; April/June, £7 18s. 9d.

NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1939.

SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1939.

CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 5½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. MANCHESTER: Pure, 1s. 8d. per gal.; crude, 11½d. per gal.

CARBOLIC ACID.—Crystals, 6¾d. to 7¾d. per lb., small quantities would be dearer; Crude, 60's, 1s. 7½d. to 1s. 10½d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.

CREOSOTE.—Home trade, 3¾d. to 4d. per gal., f.o.r. makers' works; exports 6d. to 6½d. per gal., according to grade. MANCHESTER: 3½d. to 4½d. GLASGOW: B.S.I. Specification, 6d. to 6¼d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5¾d. to 6¼d.

CRESYLIC ACID.—97/99%, 1s. 6d. to 1s. 9d.; 99/100%, 2s. 4d. to 3s. 6d. per gal., according to specification; Pale, 99/100%, 1s. 8d. to 1s. 10d.; Dark, 95%, 1s. 4d. to 1s. 5d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 1s. 8d. to 1s. 9d.

NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1d. to 1s. 3d. per gal., naked at works, according to quantity. GLASGOW: Crude, 6½d. to 7¼d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £4 10s. to £5 10s. per ton; purified crystals, £10 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free) MANCHESTER: Refined, £12 to £13 per ton f.o.b.

PITCH.—Medium, soft, 30s. per ton, f.o.b. MANCHESTER: 30s. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

PYRIDINE.—90/140%, 12s. to 13s. 6d. per gal.; 90/160%, 10s. to 11s. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 11s. to 13s. 6d. per gallon.

TOLUOL.—90%, 1s. 11d. per gal.; pure 2s. 3d. GLASGOW: 90% 120, 1s. 10d. to 2s. 1d. per gal. MANCHESTER: Pure, 2s. 3d. per gallon, naked.

XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 3d. to 2s. 3½d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 5s. to £8 10s. MANCHESTER: Brown, £8 10s.; grey, £10.

METHYL ACETONE.—40.50%, £32 to £35 per ton.

WOOD CREOSOTE.—Unrefined, 6d. to 8d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—2s. 8d. to 3s. per gal.; solvent, 3s. to 3s. 3d. per gal.

WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.

BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—2s. 1½d. to 2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.

DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.

GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works

H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.

NAPHTHIONIC ACID.—1s. 10d. per lb.

β-NAPHTHOL —£97 per ton; flake, £94 8s. per ton.

α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.

β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.

NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.

o-NITRANILINE.—4s. 3½d per lb.

m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 10d. to 2s. 1d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works

o-TOLUIDINE.—10½d. per lb., in 8/10 cwt. drums, drums extra.

p-TOLUIDINE.—1s. 10½d. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ELTON COP DYEING CO., LTD., Bury. (M., 7/1/39.) Dec. 23, £50 debentures, part of a series already registered. *£1,450. Dec. 29, 1937.

OLIVER BROWN, LTD., Mitcham, varnish manufacturers, etc. (M., 7/1/39.) Dec. 19, series of £3,500 debentures, present issue £3,300; general charge. *Nil. Dec. 24, 1937

Partnership Dissolved

GOUGH KIDSTON AND CO. (William John Gough, William Miles Kidston, and George Ernest Cary), drysalters, chemical manufacturers, wax and gum merchants, 43 and 45 Great Tower Street, E.C., and 1 Bermondsey Square, London, S.E.1. December 31, 1938. Debts received and paid by W. J. Gough and G. E. Cary who will carry on.

Company News

Solidal Chemical, Ltd., report a net loss of £2,839, making a debit balance to be carried forward of £58,225.

Chemosan, Ltd., chemical manufacturers, 141 Moorgate, E.C.2, have changed their name to Chemotec, Ltd.

W. J. Bush and Co., Ltd., manufacturing chemists, have declared an interim dividend of 4 per cent. (as against 5 per cent. last year).

Consolidated Tin Smelters, Ltd., have declared an interim dividend of 3½ per cent., less tax, on non-cumulative preference shares, payable February 8.

Glovers (Chemicals), Ltd., have increased their nominal capital by the addition of £2,000, in £1 ordinary shares, beyond the registered capital of £5,000.

British Coanda Developments, Ltd., manufacturing, research and general chemists, etc., have increased their nominal capital by the addition of £10,000 in £1 ordinary shares, beyond the registered capital of £45,000.

English Clays Lovering Pochin and Co., Ltd., report trading profits for the year to September 30 of £200,384 (£267,254), depreciation £36,161 (£31,997), income tax and N.D.C. £38,667 (£53,887), net profit £86,991 (£143,056), carry forward £33,229 (£31,604).

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—A well-established firm of agents at Karachi wishes to obtain the representation, on an exclusive agency basis, of United Kingdom manufacturers of lemon and middle chrome for Sind, Punjab, Delhi, Bombay, Kathiawar, and Madras. (Ref. No. 2.)

Egypt.—The Commercial Counsellor to H.M. Embassy in Egypt reports that the Egyptian Ministry of Public Health, Cairo, is calling for tenders for the supply and delivery of quantities of medicinal oils for the year 1939-40. Tenders should be addressed to the Director of Stores, Ministry of Public Health, Cairo, Egypt, by whom they will be received up to 10 a.m. on February 13, 1939. Local representation is essential, and the Department of Overseas Trade is prepared to furnish firms desirous of tendering for the supply of oils of United Kingdom manufacture, and not represented in Egypt, with the names of United Kingdom merchant houses with local connections who may be willing to handle tenders on their behalf. (Ref. T. 30604/38.)

Books Received

The Social Function of Science. By J. D. Bernal. London: George Routledge & Sons, Ltd. Pp. 482. 12s. 6d.

Forthcoming Events

London.

January 9.—Chemical Engineering Group. Joint meeting with the London Section of the Society of Chemical Industry. Burlington House, Piccadilly, W.1. 8 p.m. Dr. J. McKeown, "Creep in Non-Ferrous Metals."

Institution of the Rubber Industry. Northumberland Rooms, Northumberland Avenue, W.C.2. 7.30 p.m. J.P. Griffiths and C. R. Pinnell, "Production of Decorative and Ornamental Rubber Products."

Electrodepositors' Technical Society. Institution of Electrical Engineers, Savoy Place, W.C.2. 6.30 p.m. Discussion on "Recent Developments in Electrodeposition."

January 10.—Northampton Polytechnic, St. John Street, E.C.1. 8 p.m. S. Wernick, "A Decade of Progress in the Electrodeposition of Metals: Improvements in Plating Processes."

Pharmaceutical Society. 17 Bloomsbury Square, W.C.1. 8.30 p.m. J. H. Gaddum, "Recent Discoveries about Animal Hormones."

January 11.—Electrodepositors' Technical Society. Joint meeting with the Faraday Society. Northampton Polytechnic Institute, St. John Street, E.C.1. 8 p.m. G. E. Gardam, "The Evaluation of Throwing Power in Electrodeposition," and J. W. Perring and W. Wozencroft, "An Electrical Method for Testing the Thickness of Deposits."

January 12.—Sir John Cass Technical Institute. Jewry Street, Aldgate, E.C.3. 7 p.m. S. Judd Lewis, "Spectroscopic Analysis."

Oil and Colour Chemists' Association. School of Hygiene and Tropical Medicine, Keppel Street, W.C.1. 7.30 p.m. Professor Dr. Wolfgang Ostwald, "Swelling and Solubility of High Molecular Weight Compounds."

Institute of the Plastics Industry. Caxton Hall, Westminster, S.W.1. 7.30 p.m. R. P. Cartwright, "Some Factors Influencing the Development of Plastics."

January 18.—Institute of Chemistry. School of Hygiene and Tropical Medicine, Keppel Street, W.C.1. Professor E. J. Salisbury, "Chemical and Physical Factors Influencing the Distribution of Plants."

Batley.

January 12.—Batley and District Textile Society. Technical College. 7.30 p.m. Dr. Speakman, "Some Factors Affecting the Oxidation of Oil on Dyed and Undyed Wool."

Belfast.

January 9.—Institute of Chemistry. Royal Belfast Academical Institution. 7.30 p.m. A. H. O. Johnson, "Absorption of Gases."

Birmingham.

January 10.—Institute of the Plastics Industry. James Watt Memorial Institute, Gt. Charles Street. 8 p.m. L. J. B. Forbes, "Plastics in The Motor-Car Industry."

Bristol.

January 12.—Society of Chemical Industry. The University, Woodland Road. 7.30 p.m. Meeting devoted to papers on current work.

Derby.

January 18.—Institute of Fuel. Railway Institute Lecture Hall. 7.30 p.m. Dr. A. E. Dunstan, "Developments in Oil Refineries."

Glasgow.

January 16.—Institute of Metals. Institution of Engineers and Shipbuilders in Scotland, 39 Elmbank Crescent. 7.30 p.m. G. W. Lacey, "The Development of Corrosion Resisting Aluminium Alloys."

Hull.

January 17.—Hull Chemical and Engineering Society. Municipal Technical College, Park Street. 7.45 p.m. E. H. Hall, "Alchemy, Ancient and Modern."

Leeds.

January 17.—Institute of Chemistry. Professor F. M. Rowe, "Advances in the Chemistry of Dyestuffs."

Liverpool.

January 12.—Institute of Chemistry. Reeces' Restaurant, Parker Street. 7.30 p.m. Major-Gen. C. H. Foulkes, "Chemical Warfare and the Civil Population."

Manchester.

January 12.—Institute of Chemistry. Constitutional Club, St. Ann Street. 7 p.m. W. G. Campbell, "Some Aspects of Forestry Research."

January 13.—Oil and Colour Chemists' Association. Constitutional Club, St. Ann's Street. 7 p.m. C. Hall, "Nitrocellulose Lacquers."

Newcastle.

January 9.—Institution of Electrical Engineers. Dr. L. Hartshorn and others, "Plastics and Insulation."

Scotland.

January 13.—Oil and Colour Chemists' Association. J. Hand, "Pigments for Printing Inks."